

THE  
SEAMANS  
PRIMER.

Containing a perfect Patterne of an honest Life, and how to dye happie.

*Redde rationem Dispensationis tuæ :*

LUKE, 16. 2.

So much Difference as is betweene Philosophy and other Arts, so much I suppose is betweene the Phisiques with the Ethiques, which are the senceable part of Philosophy : and the Metaphisiques with sacred Theologie, which are the Intelligible part.

And why ? Because there is as much Difference betweene these, as between God and Man  
saith *Seneca* ; the former being Earth-  
ly, the other Heavenly.

THEREFORE,

By how much more Excellent a creature Man is, above a Beast, by so much the more soule is his fault, to be Ignorant, and therein to rest ;  
not endeavouring to attaine Right,  
Reason, Vertue, and  
Piety.

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Printed. 1647.

T O

**The Glory of God, and honour of King CHARLES**  
 by the grace of God, of *England, Scotland, France, and*  
*Ireland*, Defendor of the Faith, &c. This whole  
 Worke fore and aft is Dedicated; by his Loyall,  
 faithfull, and obedient Subject  
 J. S. N.

**N**AVIGATION is so notable an Art and Science, most gracious Sovereigne, that in all the World among the meaner Subjects there is hardly the like to be found. For though I speake nothing of the use and profit we receive by it, which is in manner infinite; yet in the very Substance and matter it selfe, we thinke I see it enriched with all the liberall Arts and Sciences: and also with those things for which they are learned, and to which they are Applied. That Grammer and the Mathematicques are necessary thereto, I suppose few Men of good judgment will deny, because of sensible Demonstrations, for among men of small learning: *Nihil est in intellectu, quod non prius in sensu fuerit*: Yet all ought to be done according to right Reason, otherwise it will be too rude and confused, *Omnis praxis sine pravā theoria imperfecta, et in certa est*: also the Rules of Godly perswasion, so them is right necessary. The Physiques will furnish us with manifold good things in the Art of Navigation at Sea, also for health of body, and knowledge of the mind, the Ethiques will teach us the most commendable carriage of our selves among men: No good Commander can well be without some knowledge in the Mathematicall Arts and Sciences: who of them all would not willingly know, whence he hath his owne Essence and being (if he have Grace) which is the proper Office of the Metaphisiques: And sacred Theologie teacheth us to live a Godly and an honest life; and how to die happy. All these things are touched and applyed in this Booke, In my opinion whosoever among them, denyeth this truth may be accounted therein ridiculous. Neverthelesse I conclude not peremptorily but referre all to your Majesties most grave judgement and deepe knowledge; in which God grant that you and yours, may exceed all other Men, even so farre as here on Earth you are placed by God to be the best of men. Amen.





To

and

the rest of the more gentle Race of  
that have been brought up in any good  
Literature.



It is a common Opinion (right worthy) how erroneous soever; That Navigation is come to a great perfection, God grant it be true; for though it be granted of all men, That our English Mariners may compare with any Nation of the world; yet it is observed for the most part of Sea-faring men in generall: That Ignorance, like the over-flowing of the Gall, hath gotten the upper-hand of Knowledge: Or as a disease in some men, it descends from the Parents. To remedy this, is *Opera pretium*; but, *hoc opus, hic labor est*. I will not say this is one mans work; but many hands make light work. Therefore I presume not, that these my labours are sufficient; but this I doe constantly affirme, that they lead us the right true, nearest and safest way unto that perfection which is to bee desired; and that with great facility, profit, honesty and godly pleasure, by the scope of two Words onely; To know Gods workes, with the humane Inventions of men; and most nearely to direct well, all our own thoughts, words,

B

and

*To the Christian Reader.*

and actions ; by bringing them, with the feare of Almighty God before our eyes to the touchstone :

First, of naturall Reason and common Experience.

2. To the principles of the liberall Arts and Sciences.

3. To naturall and morall Philosophy.

4. To Mathematicall Demonstration.

5. To Metaphisicall Science and sacred Theologie, which is Divine wisdom.

6. To Gods word and heavenly Grace : and —

7. To the testimony of the Holy Ghost, witnessing a good Conscience within our selves, to the glory of God and benefit of mankind.

*The space left above is, that you which are willing to bee at the cost of the Booke, may also bestow the labour to appose your owne names there.*

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23 Decemb. 1646. *Imprimatur* JOHN BOOKER.

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**THE**



# THE SEAMANS

## PRIMER.



Whoever will be a good Navigator, must have to doe with the workes of Almighty God in generall ; and with the subtle inventions of Men in particular : and to that end wee must learne the scope and use of these two words :

*Substance. Accidents.*

By the first, wee learne to know Gods workes so farre as is necessary for us ; and by the other, to find out mens notable Inventions, be they never so subtle.

The *Sea-mans Alphabet* ( *Pag. 5.* ) sheweth how Questions are modestly put ; and here note I pray how Answers are decently made, one of these foure ways :

- 1 By a full, large and perfect Argument to give satisfaction.
- 2 By a short, brief, and true Answer.

3 By good Induction to draw forth a sufficient conclusion,

4 By good Authorities and Examples.

And let us be sure they agree to common Experience, Reason, and the liberall Arts, to Philosophy, Divinity, and a good Conscience, to the approbation of good men, and to Gods glory : for so these few Lessons well understood, learned, and carefully observed in our words ; also for Action we may proceed to note.

They that hope to receive a blessing from God ; and desire a happie end, with good successe unto all their labours and honest endeavours : must serve God, and use the meanes. The meanes to attaine Navigation is, to learne the parts and their uses : Wee shewed that Navigation hath two parts, a *Theorique* and *Pratique* ; here wee goe to learne the Theorique, that is we shew what is to be done, and how in a learned way it is to bee understandingly done ; and also for our thoughts we are to note.

Because the fraile vessell of our Bodies, carrieth so rich a jewell and price in it, as is the Soule of Man : Therefore wee have the greatest need of all, to be Piloted by Gods holy Spirit, to make certaine this our great and generall voyage, to the Grave, Resurrection, Iudgement, and Eternall life : And as our grand Pilots the Divines tell us the dangers and shew us the safe way ; so we must prepare our selves, that are to goe the same voyage, against all the dangers, to avoid them and passe cleerly and safely ; by ordering well our Thoughts (words and actions) and by rectifying our judgements ; to distinguish well, between vertue

and vice.







po. ofodia of syllables, Etimologie of words, and  
 syntax of sentences: but chiefly for the longer  
 words and phrases it contains as becometh wisdom.

Though I freer make 9 parts of speech, the  
 learned do, the Greeks have all jurisdictione: the  
 subtler yet but 3 and no more: 2 of the English.

Orthographie, and Etimologia.

Orthographie is the Art of true writing, as the  
 letters are in quantity, Carital, & in it. And  
 Etimologia is written speech, it to begin with a grade  
 letter, and so must every word be written: the  
 words of the first letter of every name also. The  
 names of the Officers magistrat. And also his  
 attribut names of Angels & Spirits. All the  
 rest are to be small letters.

Etimologia is the Art of word pronunciation, and  
 hath 2 parts, Time and Accent: whereby the  
 value of syllables in any language is measured.

Time is here understood to be the measure of  
 our breath in reading & speaking. And quantity  
 of some syllables and - long, some & short, and  
 some indifferent. Also in speech & pauses, the  
 comma is a small stay for necessity of breathing,  
 the Colon is double to that, comma and the  
 period & full voyce, is equal unto 2 Colon:  
 so is the note of interrogation & a question is  
 asked, and the note of admiration is in  
 music. And at Time is noted - u, so are  
 the seconds, and the grains about the  
 first: and the Circumflex is u. To denote  
 the falling inflection & bearing about of  
 voyces: but it is the Art of music that sheweth  
 how much to rise & fall.

2 Musicke teacheth the difference of Grace &  
 Acute sounds, & also of Time & pause.  
 In the common mode (noted thus) the kind of

# The Organans

a half. A or one whole rest is equal unto two  
 some breves for on halfe a rest, and  $\text{A} = \text{doubt}$  minims  
 or quater rest; in the measure of Time. But  
 note it is mi fa sol la which is counted at first  
 for a h. p. to syllable: mi is  $\frac{1}{2}$  a note higher and  
 fa is  $\frac{1}{2}$  a note lower. C flater  
 then the unison in account: as in this middle  
 part of C scale, where the unison in Fals or  
 in Fals half no place but  $\text{A} \text{ C} \text{ b}$  account what  
 given the note at time 60.

G sol re ut	Diapason	801	unison	11
f fa re		702		
e la mi		603	Diatesseron	
D la sol re	Diapent	504		12
C sol fa re		405	Diapent	
b fa mi	Diatesseron	306		
A la mi re		207		
G sol re ut	unison	108	Diapason	9

But when the notes do ascend & descend either  
 in equal degrees 1 2 3 or by leapes as  
 from the unison to Diatesseron Diapent and  
 Diapason, then the notes must manifestly de-  
 clare & show the accounts and so manifestly an  
 excellent rule unto Organists.

And manifestly have a book full of use and humors  
 in Time & Accounts (as you see) for ornament  
 of speech: the above divided in singing of psal-  
 ms & hymns & spiritual songs & especially  
 upon the instrument microcosm.

The sound of man is the best instrument  
 the body is an instrument also for the soul:  
 with the voice, in heart & voice was most enjoyed;  
 and singing to him that exalts by even to the  
 Trinity & uncreated.

I will pray & sing praises with thanksgiving  
for money, & of judgment to God on Earth!  
will I sing. zolah even soe it amon with my  
whole hart & affection both in restant & plaine song.

The choise variet of any Tunes & song in hars  
mony are 4, and of all these the ground is 3  
bays: but the dorian & phrygian & lydian Tunes  
and 3 diuers kindes of musick, and diuersly vsed  
of musicians & learned philosophers; all which  
are to be noted, & to be observed, not without  
some good reason & caution. For in our daies  
now at this point Musick is 4 waies vsed, As in  
that corrupt & ofend manner of vulgar musick  
& taught in priuat schooles, so youn &  
musick in wanton songs & lasciuious musick;  
in that moral way of the learned philosophers;  
in a more christian way, also as the manner is  
in our christian church, and in that most  
heavenly manner of Gods Angells & the heauen.  
by host Luke 2. 14.

A good Grammarian must also be able to write  
read when others figure & stand for words &  
fontaine (besides short hand & cyphers) & ord-  
er to be ought to be more than an Alcedary in all  
natural variet & vsed, in philosophy, the math-  
matiques & metaphisiques, especially in following  
next in the 4 parts of navigation, which I leane  
in manuscript for him that will be so good as to  
bestow cost in printing it & for all those that will  
be so gracious as to make good use of it; my hope  
is that they follow not some beginning  
of man that they regard not Gods word. Pater  
and Pater qui est in celis. nonit quid etia vobis no-  
-responcia sunt hanc omnia parate itaq; primum reg-  
-nu dei & iustitia opus & omnia haec adiciuntur vobis.  
mat. 6: 32: 33.

## The Elements

### The first part of Navigation

It is met by it in the Element of Quantity, the Art of numbering with: and all numbers, with parts also call fractions flow from 1. unity.

Unity is that by which every thing that is, in this Nature or Supernatural, is said to be: 1. one: no number can be given so great but a greater may be found, by adding 1. to the number given. The greatest single parts of 1. is  $\frac{1}{2}$  and no fraction can be given so small, but a less may be found by adding 1. to the denominator. 1. does neither multiply nor divide: but 1. is a common measure unto all numbers. Unity is the Root of Number, and is called the Root of Unity.

Number is a multitude composed of unities. Some numbers are even as, 2 4 6 &c & 8 & 10 &c are odd, as 3 5 7 &c: but some are prime numbers as, 2 3 5 7 11 13 &c & some are compound as 4 6 8 9 10 12 &c. All these are called primes that no number but 1. does measure, compounds have other measures also. Example.

Let 36 be given first 31 can be divided by none but 1. therefore 31 is a prime: but 36 may be divided by all the numbers of which it is composed & made as by, 2 3 4 6 9 12 18. Therefore it is called a compound number.

To find all the measures of any number, the Rule: Divide the number given by all the primes first as 36 can be divided with 2 untill 9 last Quotient be also a prime for Example take 36 for more Example divide 36 by 2 3 4 6 9 12 18, then 9

Primer.

Quotients also are still to be divided thus  $2 \overline{) 18} (9$   
 $3 \overline{) 9} (3$  : so all  $\frac{1}{2}$  primes are  $2 \cdot 2 \cdot 3 \cdot 3$  : from w<sup>h</sup>o  
 are to multiply all together  $1 \cdot 2 \cdot 2 \cdot 3 \cdot 3$  and in an  
 other C in the same order thus:  $1 \cdot 2 \cdot 3 \cdot 4 \cdot 6 \cdot 9 \cdot 12 \cdot 18 \cdot 36$ .

Note also that the whole number of these  
 prime multipliers makes a square of  
 numbers given: and of these compound numbers  
 some are Abounding, some defecting & some are  
 perfect numbers. So 36 is an abounding for  
 the parts  $1 \cdot 2 \cdot 3 \cdot 4 \cdot 6 \cdot 9 \cdot 12 \cdot 18 = 55$  are more y<sup>e</sup>  
 the whole 36: but 35 is a defecting for  $\frac{1}{2}$  parts  
 $1 \cdot 5 \cdot 7 = 13$  are less than the whole 35: and 28 is a  
 perfect number for the parts  $1 \cdot 2 \cdot 4 \cdot 7 \cdot 14 = 28$ .

To find the greatest common measure between  
 any two numbers, the Rule: Divide the greater  
 by the lesser, & the divisor shall be the remainder  
 until a remainder for from the last divisor is the  
 common measure required: but if 1 remains  
 there are primes unless enough compound in  
 multiplying at  $15 \text{ C } 8$  only: 1 is the measure  
 of from both  $8 \overline{) 15} (1 \quad 7 \overline{) 8} (1$ : but of  $36 \text{ C } 24$   
 the common measure is  $\frac{1}{12}$  thus  $24 \overline{) 36} (1$

So the first rule are yet forty  $12 \overline{) 24} (2$ .  
 the aliquot parts of any number given: &  
 by this rule any great number or fraction  
 is to be reduced into the least terms & thus  
 $36 \text{ C } 24$  divided by 12 part  $3 \text{ C } 2$  in the same  
 proportion: so also  $\frac{1}{2}$  will be  $\frac{2}{3}$ .

A fraction is a part thus  $\frac{1}{2} \quad \frac{1}{3} \quad \frac{1}{5} \quad \frac{1}{10}$  &c.  
 on parts of 1 and  $\frac{2}{3} \quad \frac{3}{4} \quad \frac{4}{5} \quad \frac{5}{10}$  &c.

## The Axioms

Note therefore that in all fractions  
there is understood to be a  $\left\{ \begin{array}{l} \text{Numerator} - 7 \\ \text{Denominator} 10 \end{array} \right.$   
but if the numerator

be equal to the denominator  $\frac{1}{1} \cdot \frac{7}{7} \cdot \frac{11}{11}$  etc. by an  
or greater as in  $\frac{1}{1} \cdot \frac{7}{7} \cdot \frac{11}{3}$   
improper fractions & may be reduced into whole  
numbers: So  $\frac{1}{1}$  is 1;  $\frac{7}{7}$  is 1;  $\frac{11}{3}$  is  $3 \frac{2}{3}$ .

A number is made greater by multiplication, but a  
fraction is made greater by division: Again, a fraction  
is made less by multiplication, but a number by division.  
When two fractions are given to know which is the  
greater, the rule is to reduce them into one denominator  
by cross multiplication: So,  $\frac{5}{9}$  is less than  $\frac{2}{3}$ .

To reduce fractions from one denomination  
into another, the rule, multiply the numerator  
by the denominator you would have, then divide  
the product by the denominator given.

Those Symbols for the most parts  
represent Geometrical numbers as 1. q. r. qq. qr  
a. or a. e. b. d. f. g. co. This + is what  
they — minus & = is a note of equality.

To find a perfect number, the rule  
Take numbers in a double proportion from 1. until  
it shall be a prime, with prime multiplied by the last  
gives a perfect number as 1. 2. 4. 8. 16 &c  
So 6. 28. & 496 are perfects. 3 7 31

This is a perfection according to bodily sense.  
A better yet cometh to the intellectual sense of  
minds; and when we see that wisdom is one of  
the intellectual Virtues, that would be usual of wisdom.  
Hence we want 1. As it is the first gift of God  
towards the amendment of our depraved Nature:  
2. As it is the first gift of God towards our



humane capacity, as in the summe line of  
~~subtraction~~ fractions, beginning at .a.

a

10987654321:23456789012 OF  
 which may be both ways extended infinitely.  
 But both of all taken from the Pools of unity, an  
 other is begotten; together making 2; the Pools  
 of all according Powers: the first & last  
 from prime numbers; from these proceed  
 the third together & a part the most solid  
 beyond all admiration if I mistake in unity:  
 containing the whole & the parts of the  
 first & the last perfect number & all in all.  
 These are to be learned with the best morall  
 & divine; by the faculties of our soules subli-  
 ming the affections & governing our passions  
 to the obtaining of such heavenly grace and  
 assistance without: in numbering in daist.

Arithmeticks hath three parts: 1 Addition &  
 its contrarie neg. by Subtraction; 2 multiplicat  
 with Division to prove it; and 3 the Rules of  
 proportion. Examples of the first part.

$$\begin{array}{r} 5678 \\ 2012 \\ 3456 \\ \hline 18146 \\ 5678 \end{array}$$

$$\begin{array}{r} 25:25 \\ 13:5 \\ 7:75 \\ \hline 46:5 \\ 25:25 \end{array}$$

$$\begin{array}{r} 0:125 \\ 0:2765 \\ 0:2015 \\ \hline 0:925 \end{array}$$

$$\begin{array}{r} 2a + 3c \\ a + c \\ \hline 3a + 4c \end{array}$$

$$\begin{array}{r} 2a \text{ --- } 3c \\ a \text{ --- } c \\ \hline 3a \text{ --- } 4c \end{array}$$

2a + 3c      a      c  
 in the same way Addition & Subtraction  
 in the same way Addition & Subtraction

# The Grammar

But in contrary signs of subtraction for addition: set to remainder the sign of the greater number: act in subtract of addition. Set the sign of the open number to the total sign.

$$\begin{array}{r} 3a + 5c \\ 2a - 3c \\ \hline 5a + 2c \\ 3a + 5c \end{array}$$

$$\begin{array}{r} -2a - 3c \\ 3a + 5c \\ \hline 1a + 2c \\ -2a - 3c \end{array}$$

Examples of the second parts.

$$\begin{array}{r} 392 \\ 8 \overline{) 3136} \end{array} \quad (392$$

$$\begin{array}{r} 6:5 \\ 1:25 \\ \hline 6:25 \\ 75 \\ \hline 1:25 \end{array}$$

$$\begin{array}{r} 0:75 \\ + 9 \\ \hline 7 \end{array}$$

$$1:25 \overline{) 6:25} \quad (6:5 / 0:75) \quad 0:5 \quad 6:25 \quad (0:75$$

$$\begin{array}{c} a^2 \\ e^2 \\ \hline ae \end{array} \quad \begin{array}{c} a \\ a^2 \\ \hline a^2 \end{array} \quad \begin{array}{c} aqa \\ at \\ \hline at \end{array} \quad \begin{array}{c} e \\ e^2 \\ \hline e^2 \end{array} \quad \begin{array}{c} ee \\ ee \\ \hline ee \end{array}$$

multiplication & division in the same signs is  $+$ , but in contrary signs is  $-$

$$\begin{array}{r} a - e \\ a - e \\ \hline a^2 - ae + eq \\ a^2 - 2ae + eq \end{array}$$

But gongis figurati is a kind of multiplication, as

$$\begin{array}{r} a + e \\ a + e \\ \hline a^2 + ae + eq \\ a^2 + 2ae + eq \\ a + e \end{array}$$

And out of the symbols of gongis figurati is made the Table to help the memory in analysis. Latavich, which is a kind of division, it is contrary to the Gongis.

$$\begin{array}{r} a + 2ae + aeq \\ a + e + 2ae + eq + ee \end{array}$$

$$\begin{array}{r} a + 3ae + 3aeq + ee \end{array}$$

The Table

a	a	a
a	ae	ae
e	2ae	3aeq
1	eq	ee
		3

Reimer.

To make the Square & Cubes

$$\begin{array}{r} \text{p a t e} \\ 7 : 5 \\ \hline 19 \ 49 \\ 2ae \ 20 \\ \quad eq \ 25 \\ \hline 9 \ 56 : 25 \end{array}$$

$$\begin{array}{r} \text{p a t e} \\ 7 : 5 \\ \hline at \ 3 \ 4 \ 3 \\ 3age \ 7 \ 3 \ 5 \\ 3aeg \ 5 \ 2 \ 5 \\ \quad et \ 1 \ 2 \ 5 \\ \hline 1 \ 4 \ 2 \ 1 : 8 \ 7 \ 5 \end{array}$$

Contra to Extract the Square & Cubes Roots.

$$\begin{array}{r} 9 \ 56 : 25 \text{ (7:5)} \\ \hline 19 \ 49 \\ \quad 7 \\ \hline 2ae \ 7 \ 0 \\ \quad \quad 2 \\ \hline \quad eq \ 25 \end{array}$$

$$\begin{array}{r} 1 \ 4 \ 2 \ 1 : 8 \ 7 \ 5 \text{ (7:5)} \\ \hline at \ 3 \ 4 \ 3 \\ \quad \quad 7 \ 8 \\ 3age \ 7 \ 3 \ 5 \\ \quad \quad \quad 5 \ 3 \\ 3aeg \ 5 \ 2 \ 5 \\ \quad \quad \quad \quad 1 \ 2 \end{array}$$

Astronomical fractions are  $et \ 1 \ 2 \ 5$  to be reduced to integers, & this line of Powers is necessary to be put out.

But I taught John Wallington  $21600^t \cdot 3600^q \cdot 60^s$  how I made for him the same Table of Squares & Cubes from 1. to 10000, which I have published since Decr 1635 in his folio book intitled Pyrotechnia.

1.	1.	1.
2.	4.	3.
3.	9.	5.
4.	16.	7.
5.	25.	12.
6.		17.
7.		21.
8.		28.
9.		36.
10.		45.

*The common difference*  
*The common difference*  
*The common difference*

and in such method I have made other powers: and by an other very brief method I will willingly shew how to extend my Draft Table of Roots; unto any power, or to any number of roots above 1000, which he hath finished.



## Demon.

Twofold, 1 of Equality, 2 of Inequality:  
 be borne or by fortitude and Temperance.  
 And as Gods wordes are learned of vs, by  
 the vowels & consonants in this Alphabet  
 of naturall Reason & morall vertues: So  
 we haue to learn so much as shall be ne-  
 cessary for vs in Gods word; by the  
 whole Alphabet of diuine vertues, and  
 heavenly Graces.

These proportions extend to musick harmonie  
 in number waight harmony; also into  
 measure time & motion.

Equality

But the speciall proportion of Equality  
 haue intended us when our magnitudes are  
 equal vnto diuers other; words of sum  
 are giuen, by which they are found; are  
 in these propositions following.

Pro: 1.

To diuide a number into two such  
 parts, as shall haue a giuen differ.  
 Let 120 be giuen, the difference 25; the  
 rule; call either of the required numbe  
 1. Then either you may say 1 &  $1 + 25 = 120$   
 & subtract from both 25, & shall 25 = 95, so the  
 least will be 47.5 = 1. or 1 &  $1 - 25 = 120$ ; now  
 ad 25 to both sides of the equation the total  
 will be 25 = 145; & the greater is 72.5 = 1.

Pro: 2.

To find a giuen number in these  
 such parts, as shall haue two differ.  
 Take 120, & let the difference be 6, 12 & 18.  
 Then 1 &  $1 + 12$ , &  $1 + 30$  is 3 &  $42 = 120$

## The Barnard's Reimer

now take 42 from both sides of the equation  
 C at least £ = 26. In the year 1733 if the  
 commander a be to have so much as the officers  
 b c & others; C has to give as much as the  
 common man c: c. 7<sup>th</sup> month, 1700, if 100, the  
 parts of all the ships company will be  
 $a 39 + b 34 + c 27 = 100$ .

Pro: 3.

To divide a number into two such parts  
 as have a given proportion.  
 Let if a b c r, being all the ships company  
 are to have 700, so divided, as a to b to have  
 5 to 4 parts, c b to c 3 to 2. the rule  
 Let the least be 1; as c 1, then it will be  
 $c 1 + b 1\frac{1}{2} + a 1:875$ , or  $4:375 = 700$ .  
 C at least  $a 300 + b 240 + c 160 = 700$ .

## Frequentia.

Pro: 1.

To divide a number by Extremes &  
 means Proportion; the rule.  
 Multiply the square of the given number  
 by 5: & divide that Product by 4: then from  
 the sq of the Quotient, subtract  $\frac{1}{2}$  of the  
 number given, for the remainder is the  
 greater part; c is the mean to be added  
 the whole c the lesser part: but since  
 the division of a rational number is inde-  
 terminable, it is said to be almost dividing in  
 a moral sense: and in a Christian sense  
 it is a symbol of a heretic in unity; pro-  
 utipin vultu ruli, primum at baptismum.



pro: 2. 3. or.  
The proportion of two numbers is, as the square  
of the one, to the rectangle made of both.

And when numbers are in continuall pro-  
portion as the first is to 3. so is the square  
of the first to the square of the second.

When the first is compared to the fourth  
it is found to be as the cube of the first, to  
the cube of the second, or. as the first is to  
is to find means proportionals: as also to  
find either extremes or means.

But there are 6 severall varieties  
of proportions, as these.

- 1 Continuall as 4. 68: 16. 32.
- 2 Inverted as 16. 32: 4. 68.
- 3 Alternat 32. 68: 16. 44.
- 4 Composd 32+16: 16: 68+44. 44.
- 5 Divided 32-16: 16: 68-44. 44.
- 6 Composd 32. 32+16: 68. 68+44.

These are Arithmetical proportions, but  
there are besides these. Both Arithmetical  
& harmonical proportions; and these do all  
appear in these. 6. 8. 9. 12. numbers.  
for 6. 9. 12 are in Arithmetical propor-  
tion. 6. 8. 12 in musical proportion.

Nevertheless, the proportions of inequality  
- by rule of the proportion of Equality first.  
Then one proportion out of an other: and if  
any proportion be multiplied or divided by  
one or by several numbers, it doth a like por-  
tion. But proportions are added as fractions  
are multiplied; & subtract as fractions are  
divided.

## The Bananw

### The second part of Navigation

Geometry is the art of measuring well: and all measures flow from a point. a point is that which hath no parts; which is simple let him come hither saith wisdom prov. 9; & sa. pauls saith, I would have you wise unto it which is good, & simple concerning will, Rom: 16. Therefore at the start of the Lord is the beginning of wisdom, so we must begin at God to learn his word, that is our school, & so learn to be fit for God.

Understanding is more in the understanding & Geometry more sensible; yet the geometricall point is altogether insensible, and it is a symbol, first wonderful, that being neither a spirit, nor a body, & hath no parts, yet is not without the compass of it & accidents; for by qualities it is the utmost bounds of all magnitudes & neither augmenteth nor diminisheth: any quantity. 2 Admirable that upon we shall inquire the magnitude & measure of God, surely he is infinite & incomprehensible, therefore within no bounds or accidents, whose center point is every where, & circumference no where. Metaphysically, the geometricall point, vol. it is not, non ens, but God is super-substant, that Eternall Ens, from whom all is.

## Primer

wecke sans point effendu & being, sit on  
in nation & extension, or what substantia.

By the motion of a point line is  
made. A Line is length onely: by the  
motion of a Line, superficies is made;  
A Superficies hath length & breadth  
onely: and by the motion of a superficies  
solid is made; now a Solid body  
is that which hath length, breadth, and  
thickness. Therefore, as the bounds  
extremes of lines and points: of super-  
ficies, lines; & the extremes of solids  
are superficies. So Geometry divideth  
it selfe into three dimensions: 1 line=  
all: 2 superficial: & 3 solid measure.

Dimension.

The things shew'd measure, agreed upon  
by act of parliament, & kept in the Kings  
Exchequer; is our Rational line first sett:  
And being as it is, put into a certain nu-  
mber of equal parts; all other right lines  
compared thereto, are either; 1 Rational  
or 2 Surd. Rational, either in length &  
power; or in power onely. Surd by name,  
1 The mediocr line; 2 the binomial; 3 the  
residual; & 4 the less line or, certain oft  
indee sui et curui: & of these oblique &  
crooked lines are, by name; 1 the circle;  
2 the ellipse; 3 the parabola; 4 the spiral line; 5 the  
parabola; & 6 the hyperbola.

# The Mathematic

## 2 Dimension.

A Surface is either, an Angle, or a figure. & agains these are either, plain or bow'd. All rectangles are equal & all oblique angles are greater or less.

An angle is included of two lines and must be less & on 180°. But of right lined figures, the least must have 4 sides & the sum of 4 the shortest must be longer than the 5 sides. The circle hath 3 parts: 1 the semicircle; 2 segments; & 3 parts. The triangle hath 3 parts to be taken into our consideration; 1 the angles, which in a spherical triangle are more than 180°; but in right lined triangles just 180°; 2 the superficial area; 3 the sides; & 4 the words of 3 parts: of these triangles are 7 sorts; 1 the equilateral; 2 the isosceles; or trigonal; 3 the oblique; & 4 the scalene.

Of 4 sided plain figures, are 5 sorts. 1 the geometrical square, from whose measure all figures are measured; 2 the oblong; 3 the rhombus; 4 the rhomboid; & 5 the trapezia. Then of multilateral; are the pentagon, hexagon &c. All irregular plains may be reduced into triangles, & so may be measured: for every

plaine triangles superficies is Equall unto  
 1 square or oblong, made of the base & cataph.  
 In the 13 figures all the plaine triangles  
 & Geometrical square & Regular polygon and fifth  
 expressed in the first & 2d. but the side a.b. in  
 the figure is the less segment of a line divided  
 by extremes & means proportion, unto which the  
 other segment is the line a.c. also means the  
 end c unto e. draw the line b.f. for so a.c. is  
 cut in 2 into the les. & portion.

perfect Dimension.

The most perfect solid body is the Sphere, because  
 of its uniformity. So all the celestiall bodies  
 round as they are, & the earth of the world, in which  
 they move are round about their axis for  
 many perfect bodies as the round globe in  
 the 13 demonstration, & the Sphere of the  
 world it self is the most perfect body.

There are also many varieties of solid bodies  
 and are the severall differences of shapes, in the world  
 frame of Nature, but these 10 are the chiefest; &  
 rest are irregular; The more Regular are the  
 cone 4, in the cylinder 5, with the sphaeroid 6.  
 But the most Regular bodies are these 5, & they  
 are contained of Regular plaine & solid Angles.

1 The tetrahedron comprehended of 4 equal solid  
 angles, & hath 4 solid angles as the figure 8.

2 The octahedron contained of 8 equal solid  
 angles, & hath 6 solid angles, as the figure 10.

3 The hexahedron comprehended of 6 Geometrical  
 squares, & hath 8 solid angles, as the figure 9.

4 The Icosahedron contained of 20 equal triangles  
 & hath 12 solid Angles, as the figure 12.

5 The Dodecahedron comprehended of 12 regular pentagons

# The Hexagram

pentagon, hath 20 solid angles, w<sup>ch</sup> 6 figures 11. It is  
a mixture of ad majora symphon. est. See fig 1  
Dodecadecagon is the greatest being all inscribed in  
a circle & having 12 sides: the dodecadecagon next, then the  
hexadecagon, & so it is the octadecagon, & so the triadecagon next.

But the side of the triadecagon is longest; of  
the octadecagon next; & then of the cube or hexa-  
hedron less than the side of the dodecadecagon.  
The dodecadecagon side is the shortest. For it is  
that residual line (which is the greatest segment of  
the inscribed cube side, divided into the 12 & 13 sides)  
which the side of the dodecadecagon being rational.

But because it is inexplicable & difficult  
to the outward senses; we shall make it ex-  
plicable morally, & to reason the guide of  
our inward senses, & virtues of the mind;  
as in the 13. figure: Plato dixit Quas Alas  
Numerorum et figurarum Scientiam, additque offi-  
cium humanum, quasdam in Cœlum pro-  
movent: Therefore we come to the 13<sup>th</sup> figure  
and laying the cross even in a naked symbolical  
form: a. to. c. & the less segment equally  
from a. to u. & v. then divide a. c. in three  
equal parts at: e. c. i. And so it will be  
a symbol of the Trinity in unity; if  
to express vice (the subduer of sin) we place  
plendours at: c. in the heart; justice at: e. in  
the breast; fortitude at: v. in the shoulder; and  
temperance in the brain at: a. so drawing  
out a clear conscience, by the head & under-  
standing, containing the body with good conscience



Primer.

to obtaine a measure of giftes of grace  
in thought word & action; that the whole  
pure soule & Body, may be a fit vessel for  
the holy ghost.

Then we will bring the 4 Diptonges  
in the Alphabet of Imin vowels, and  
heavenly graces; first to the head; we put  
be cause faith cometh by hearing; and  
hearing by the word of God; therefore  
we must heare with both eares at once, as  
at:u: e:y: this faith unfained we must  
bring in by:u: e:y: unto the eares at:a: and  
thence through heare assured we let down  
the word of God into the hart, at:c: e  
thence we shall find the love of God; e  
so fixing the love of God in our hearts;  
God forbid that we should rejoice in  
any thing, but in the crosse of our lord  
Jesus Christ: which is our most sure and  
true consolation.

The end of Exomety is to build rock and upon  
this sure foundation we shall have a building given  
us of God 2 co: 5: And being marked before  
with Tan, fig: 134: we shall escape the  
general destruction, Ezek: 94: if with Humi-  
lity & patience we do diligently heare the  
vowels in the Imin Alphabet, by holding fast  
the orthodox doctrines of our Christian prin-  
ciples, & vehemently vindicating the truth; and  
being resolved of all doubt, observe well the

## The Seamant

consonants, by Iustification of good life & maner, according to Gods Law: Redarguing (& at it confuting) all false principles & correcting vice & sinne, that it brings not in our mouth all boddies.

Alwaies praying to God our Father sanctified his name, & glorifying unto him in his name & by his mediation of his son, as he himselfe hath taught us: And by his earnest of his spirit & cor: 5: redcovering in his covenant, & holding fast his 2 bonds & proof, untill he shall come againe, to judge, & quite & to do so.

This is the summe of the true christian protestant Religion; in this waye I borne baptizod bread & have continued according to the Church of God & Christ in the Church of England, and in this (God assisting) waye I die.

The 3<sup>d</sup> part of Navigati.  
Statique is the Arte of waighing well and talde beginning also at the standard of England; the 1<sup>st</sup> wait is divided into, 12, or 10 pound, & less as drams, scruples, penny-waits, & grains. The 1<sup>st</sup> wait is grosse or fustle; & 20 pound waight is 1 Tunn: & howe by ships are laden: by the waight.

C measure liquid on dry: for  $\frac{1}{2}$  wait  
C cube measure, compared together: or  $\frac{1}{2}$   
Cun waight, it to  $\frac{1}{2}$  Cun measure: so must  
be  $\frac{1}{2}$  waight of  $\frac{1}{2}$  wols cargason of  $\frac{1}{2}$   
Ship be into  $\frac{1}{2}$  number C measure of  
Cunners  $\frac{1}{2}$  vessel is: As if a good ship  
have neither lading nor ballast she will  
overset: being equally laden on ballast swim  
it bothward wind C water equally.

And though it be so that  $\frac{1}{2}$  magnitude  
of 1 Cun be allwaile  $\frac{1}{2}$  same yet  $\frac{1}{2}$  waits  
 $\frac{1}{2}$  of different much oftentimes: C  $\frac{1}{2}$   
heavier wait of adgnate magnitude sinks  
first C fallst swiftest at experience proved.  
Cork floats aloft C fir not above  $\frac{1}{2}$  immersed  
but solid timber all just in  $\frac{1}{2}$  water: for  
 $\frac{1}{2}$  first waite not above  $\frac{1}{2}$  of some wa-  
-ter in magnitude:  $\frac{1}{2}$  second about  $\frac{1}{2}$  so much  
C  $\frac{1}{2}$  third equally: And though heavier  
stones C molles will sink immediately  
yet a vessel of any molles that will hold  
more water in waite, then is  $\frac{1}{2}$  waight  
of  $\frac{1}{2}$  vessel:  $\frac{1}{2}$  vessel will swim.

The wonderfull varieties of in human  
Inventions, staticall, are all of fewer sorts or  
Cun, then  $\frac{1}{2}$  of us shall find in our own  
bodies, much lesse then in  $\frac{1}{2}$  wols frame  
of nature, C his goodly parts: as in  
 $\frac{1}{2}$  wols frame of  $\frac{1}{2}$  visible world:  
Each of all whom we behold with admiration  
C Adorn, God  $\frac{1}{2}$  creator; C in visible beings:

The Elements

for the invisible things of God, are clearly  
seen, by the creation of the world.

The great & ancient philosophers learn  
= id. the knowledge of the world by the 5 Regular  
bodies geometrical & the forms may rose  
thence v. for an entrance into natural phi-  
= losophy: 1 They judged the world visible  
world to be like the universe; 2 the world  
= cadron taught them to divide the celestial  
parts into 12 equal parts, which in  
the world described, the constellations fixed  
stars & planets. 3 by the six elements or  
= cadron, with the accidental & visible  
parts of the elements, they understood the  
five elements above next under the moon:  
4 In the octadron they conceived the nine  
= cadron the principal winds: 5 &  
the wonderful waters by the multitudine  
= cadron the stability of the earth  
concerned they to the end.

Navigable like as it is used in the middle, between  
wind & water, so it hath most need of the two op-  
= cadron, for by the parts of the earth under the water  
have humans justifications, & from above we have  
the plentiful blessings of the life, & that which  
is to come: it is proper to the good to join on  
to have both Rational & natural astrology  
with the orthodox Art; for who forget not the  
strong effects of celestial in the world, are  
not to be blamed, & most of all, & all of them in

inhabitants visible & invisible, & spirits, &  
 this in the air, & all the vast space under  
 the bow of heaven; (and yet not I say)  
 I omit of God doing his will: what I  
 can it avails stronger to be expounded, &  
 yet still in the air, as in all other creatures  
 it is so to be omitted & negligent in the  
 Statist part of his own state: being too bold  
 & full of air, as though in the sight of nature  
 he were able to overcome all, by trusting out  
 to sea against unquenchable water: but where  
 experience of his kind (I hope) doth make all  
 men careful to know the earth also: it is  
 his experience (the mistress of fools) cannot  
 bring forth the true child of God: for  
 artificial speculation is the father  
 so (not otherwise) experience is the mother  
 of truth: all experience teacheth, that earth  
 & water are not bodies over bearing themselves,  
 fire & air light & airy, & upward, &  
 yet we see they never part, & there is no sep-  
 aration in all nature's works; Therefore  
 in his natural Statist, to our modest ad-  
 miration, all things under & above are in great  
 agitation, working wonders; as under us in the  
 earth, & sea, breaking out of the earth, stones,  
 water, winds, earth quakes, various fires, & air  
 & fire about us, winds, water, storms, tempests  
 such rains, fogs, & lightning, and  
 about comets, blazing stars, & comets, &  
 comets, flames in the air, & comets, &  
 comets of fire, at the death of Elizabeth saw it.

## The Brauans

Upon the clouds is contained those of the  
we are subject to a richelbourg leuonoff, our  
nailinches: when it is a little foggy, we  
are subject only too much blue, or rather of blue.  
According to the clouds diversities considered.

As the mountains are of two sorts: 1. the  
clouds, fumes, & fumes, 2. the most warlike  
clouds, mists, & dews: so some of the clouds  
interact with each other, between our eyes, and  
an observed appearance in the heavens  
making it to seem higher than it truly is:  
the foggy state, being sometimes formed  
by a stream, to be near a degree: again  
the round body of the earth, & the  
bare or bare, above the true horizon of the  
world; & the parallel, making it appear  
as if it were to some loss in altitude by  
the truth. The general galaxies of celestial  
appearances are 5 fold, 1. of altitude, 2. of lon-  
gitude, 3. of latitude, 4. of rectascension, and 5.  
of declination.

In the view of the world framed  
as we see it with many bodies revolving about in  
their own spheres, the planets, & the stars are  
all once mingled, the images or pictures of  
living creatures, & things, innumerable; as in  
the place, to the eye, the appearance of a chariot  
in that of a bear, the of a letter A or Tri-  
angle, & the world of the world towards the  
north more visible than all the rest.



The Elements are 4, no doubt said here, 1. the  
 fire, brought with being highest, & bright side  
 of. Somany stunts too fling. 2. Spirit vitall  
 with y<sup>e</sup> greatest & lastest call Clove, is a vitall  
 element, & give life to all things (Publinary)  
 it sove vassety & vovoght all, & is intowning  
 in y<sup>e</sup> world & shadow of the Elements, & make  
 the Earth hang voyled in the midst so  
 got or with the 4<sup>th</sup> with the water; so that  
 by a mutual embowtment, one of another  
 their diverse natures are linked together.  
 For the light Elements, are kept in & restrai  
 ned, by weight of the heavier Elements, & so  
 they cannot fly out; & againe the massier  
 are holden, & they cannot scatter: so  
 by means of the lighter, but can't be  
 aloft, by an equall indurour, of the hea  
 vious, each holdeth its owne place, in the  
 vassety elements of the world moving.  
 well by reason, that it cannot move  
 upon it selfe; the Earth fall to the lowest, &  
 hangs steady by the poles of reason; voyl  
 ing these Elements, by which it caught; in a  
 counter ballance.

There is a proverb sometimes used by way  
 of reproch (not without cause) for you a man or a  
 Beast? howe bet you look upon our society & learn to  
 know a man: will you be a beast? be ignorant  
 of full covetous, that is worldly, sensual, dilish.  
 & you are the worst of beasts & can be.

But will you be a man? begin to learn of difference  
 between a man & a beast: for so many good know  
 ledge, as you have about a beast, & so much art & know  
 ledge standeth more from a beast so much more  
 you differ from a beast.

## The Reasonant

Man without understanding differs not from  
a beast that is brutish: therefore so much as  
differs in knowing & differs from a beast, so  
so much to exalt a man.

To put further into a millstone you can do  
man can, & to learn to good use & virtue  
of all other stones, minerals, metals, plants,  
vegetables & animals, we must learn natu-  
ral philosophy, & we shall no doubt find  
great matter among the learned philosophers  
& philosophers: And if minerals by their bodies  
be vegetable in potentia; & vegetable by their  
essential virtues, be also animals in potentia  
then may animals be also rational in potentia  
by their essential virtues; yet no creature  
is rational in essence but man only.

There fore in the strict man is found  
only, & capable of morality; yet note  
in Aristotle's eggs are ordered into 4 degrees. 1.  
divine physician for the Soul; 2.  
physician for the body; 3.  
lawyer for discovery of  
body & mind; & 4. philosopher. These last are  
indeed as children subject to the rest; but  
for as much as they are of greater  
simplicity, & have more in number of  
senses, & are fitter to be accounted & rest;  
they must be be serviceable unto them  
& take care of them as fathers of children.  
If a philosopher be witty, let him take heed  
be not wicked; the physician that he be not  
intolerable; the lawyer that he betray no  
man's cause. And the divine may be  
conscientious if he be not contentious.

primor.

The 4th & last part in the  
fourty of navigation  
Astronomy.

Astronomia est scientia de mensura et motu  
sphaerarum & siderum. Cui negat esse Deum  
portet modo Sirona coeli; Sirona qui portat, non  
negat esse Deum. ferre hoc sironis certare &  
Etoris et Eod. Et cum his hinc rejoyce & heart!  
ps. 19. whose mind the very marvellous & wonderful  
of naturall & morall philosophy is set forth  
unto vs, both in the substance & vertue; by the  
swifte finger of Iherusalem. Quanta dulcedo est videre!  
mixandū cordium in doctrina numerorum & geometriae,  
et considerare quoniam magnitudines corporum coelestium &  
conuersa et motus spacia et alia multa in numeratione & men-  
suris proportionibus vestigiis reperiuntur: quas non sunt per  
via sensus sed mente de penetrat.

Astronomy hath two parts; 1. Time ciuill; and 2.  
Astronomical: Ciuil is made by the <sup>gouernance</sup> motion of  
all the Stars & Planets in common from East to  
West in 24 hours, called a daie ciuil or

Time Astronomical it found by the speciall and  
proper motions of every particulare Star & Planet;  
from West to East. first the signefie or Zodiac, diuided  
by 12 creatures contraynt to be in with 8 maner of 8  
Sunne Part in the middle of them, and 7 others stars  
scattered one from an other, contains seaueth rock of 7 stars  
wandering are called planets, and in the middle of the year  
O at the end of all the West, being most prestant table of  
course, ps. 19. and as out of our book saith

from out of them into 8 Bull at the end East gan  
crank; by order in this and last part, & c. & the  
that men call: rich part doth 8 Zodiacs just in the  
middle diuide; that 8 degrees of the 8 of 8 and fourth  
from it on every side.

## The Almanac

But because of parallel of  $\odot$  &  $\odot$  lower planets  
make them appear more to the south, into town  
that would more than 3000 in north latitude. For  
the lower is above 7 or 8 degrees for 2 degrees on  
each side. Take annual motion of  $\odot$  tipped stars: 51.  
of  $\pi$ : 18769—12.  $\pi$  4332—37.  $\delta$  686—59.

$\odot$  &  $\odot$  in Luna 365 <sup>Days</sup> 15 <sup>Scruples</sup> 224—42. of  
at 87—53. & all their various motions beginning at  
noon are in the Ephemerides. Now also we may  
find the motion of the nodes of  $\odot$  daily 3—10—38".  
Contrary to the sign, & it is equal to  $\odot$  rings but the  
it is according to the order of the 12 signs. The first are  
marked: A. A. And here is a Table of  
the longitudes, latitudes, declinations, & distances  
of all the most notable  $\odot$  & planets fixed  
stars, taken out of the Ephemerides for anno  
domini 1640. The reason of all this is demonstrated  
in the Ephemerides A. B. C. D. E. F.

Time civil is found by the  $\odot$  motion which  
in our year is 365  $\frac{1}{2}$  days nearly; but leaving out  
the fraction, & making every 4<sup>th</sup> year a bissextile  
or leap year of 366 days, just brings it returning  
unto a new equality. Dividing the year  
into 12 months, & the 12 constellations in the  
zodiac into 12 equal parts; & again  
the  $\odot$  hath one spirital revolution in 28 years  
each & circles of  $\odot$  for after 28 years the same  
mical letters come to the same as before.

The reason of this is the leap year, 4.  $\odot$  &  
mical letters 4, multiplied, make 28; and  
the  $\odot$  hath one spirital revolution in 19 years, for  
after 19 years the same day of the moon comes  
to the same as before; & out of months of  $\odot$

moons differ from  $\odot$  are less by an  $\frac{1}{2}$  year  
month of the year, these being 365 days at  
least, but these 12 months are but 354 days.

To find the prime, the rule, unto the year  
of christ add 1. Divide by 19, the rest is prime.  
but if 0 rest 19 is prime.

There is a number call'd the Exact; made of the  
11 days that the former 354, want of 365:

To find the Exact, the rule, multiply the  
prime by that 11, divide by 30, the rest is Exact:  
when the prime is 1 the Exact is 11; when the  
is 1 the other is 11.

To find the circle of  $\odot$  the rule, unto the  
year add 9, divide by 28, the rest is the true  
sought, but if 0 rest, it is 28.

So the greatest prime can be but 19; Exact 29.  
circle 28, the letters but 7. going backward  
from g. f. e. d. c. b. a, but every year hath twice  
one going with the prime January 1. the other Feb:  
24; the Exact mark the first day.

The Reason of the moons change, did 19 years  
one the same day is, from the equation of 12 in 19  
which is the same as the moon's month:  $\odot$  is  
133 made of 15 in 4, yet makes the moonable fraction  
to be the same day of the month as before in 133 y<sup>r</sup>.

So by the prime, Exact, Dominical, & circle Solis:  
we can find the month, the year, the year, the  
= bleb, of the prime, Exact, circle of  $\odot$ ; Dominical  
letter; moonable fraction, intervals major &  
minor. Easter, & the change of the  
in every month for any year; all these  
being of small use in civil accounts: as the  
astronomical is for planets observations.

Running lightly touched by 3. first of 4. & liberal servants, & not mixt out of 2. but of good & plentiful reason, as by 6. we may amplify with 4. & so we do it lawfully, & not with such sweetness of words; and for figure of Affection, as to call forth some to curious good men, & cry up benefit benefits;

To conclude, let vs a little consider 4. 1. In 4. scale of musick common, & of it is to be observed in respect of 4. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911. 912. 913. 914. 915. 916. 917. 918. 919. 920. 921. 922. 923. 924. 925. 926. 927. 928. 929. 930. 931. 932. 933. 934. 935. 936. 937. 938. 939. 940. 941. 942. 943. 944. 945. 946. 947. 948. 949. 950. 951. 952. 953. 954. 955. 956. 957. 958. 959. 960. 961. 962. 963. 964. 965. 966. 967. 968. 969. 970. 971. 972. 973. 974. 975. 976. 977. 978. 979. 980. 981. 982. 983. 984. 985. 986. 987. 988. 989. 990. 991. 992. 993. 994. 995. 996. 997. 998. 999. 1000.

Nulla sit creatura quae non dulci harmonia soni afficiatur gaudio, et a tripi. Consonantia cogitatu: Nantat atq. Romigot, in super pond omnet Artistet manu operantib; vocis modulatione labo- not facilius ueste tolerand; experientia docuit.

2 In 4. scale applied into numbers and 4. old Greek names applied; it is to be observed & better understood, that of Plato concerning 4. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 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995. 996. 997. 998. 999. 1000.



in the numbers 6. 8. 9. 12. of the first accord  
C consonant in music. the numbers 6. C. 8.  
have fourth, fifth, sixth, seventh consonant  
pentaphony, diatesseron, C. 9. and hemiolion, C  
epitriton, C. 12. diatesseron; between C. 12. & 9. dupla  
consonant diatesseron; there is also a proportion of  
Tone & semitone, in 9 C. 8. but the perfect un-  
like stands of equal parts. C. of 6. C. 4. C. 3.  
more of the beginning & foundation of number will  
write or one, of the first even number 2, C. first  
odd number 3. C.

3 To the same scale applying the  
geometrical intervals we have a simple  
& rational doctrine of Astronomy necessary  
unto the contemplation of ecclesiastical harmony;  
first in filling up the intervals between  
the planets, with the 5 regular bodies, in the  
order from the least interval to the greatest,  
at 1. the octadecoron, 2. the dodecoron, 3. the hexadecoron,  
4. the triadecoron, & 5. the pentadecoron, in getting  
the concords of the agreeing times & condi-  
tions, the whole system appearing in the body  
of the same scale of music. harmonical uni-  
versals of all planetary, & perfect first a crea-  
ture proportioned harmonical: Book. digest.

The choice of genuine praises for the  
same system, or right frame of a system,  
is to be given unto Ptolemy for antiquity;  
to Copernicus for rarity; & to Tycho Brahe  
for diligence; & the two are the 3 astro-  
nomers that have excelled the rest.

## The Etamane

The last consideration we take of top agreement & harmony celestial & terre above. Animals bodies considered together: which I will set downe in tables & so leave it to J find it in my Astrolog. Mathematicke.

1. *Regem conditoris sapientiam, virtutem ac providentiam hic quoque voluerit invenire: eo opifacit autem in rebus aequalum. Spiritus forma*  
= *ter corporum, celestis est & astrophora.*

2. *Solus & ceteri universi, non non partium spiritus Deus*  
= *autem est & creator: Animas rationalis & compositas,*  
= *non non partium spiritus, Deus autem est & creator.*

*Quod Solus & ceteri regit ac movet, est immen-*  
= *tabilis: quod anima rationalis & corpus humanum*  
= *regit ac movet, est immortale.*

*Ceterum partem seu stellas, duplici motu moven-*  
= *tur: Corporum humanorum partem, duplici motu*  
= *movetur.*

*Sol de cetero inferiora omnia sibi commissa*  
= *beneficio spiraculo temperat, ac reficit: Anima*  
= *rationalis in corpore omnia sibi commissa et.*

*Solus motus in cetero constans est et inde-*  
= *fatigatus: Omnes rationalis motus in corpore*  
= *constans est et.*

*Sol nullius est dum est indiget, ut vivat*  
= *suus exerceat & exorat: Anima rationalis null-*  
= *ius est dum indiget, ut vivat suus in corpore*  
= *exerceat et exorat.*

3. *Solares spiritus & radij, essentia sunt*  
= *simplicissimas & planas astrophoras: Spiritus*  
= *humani corporum, essentia sunt simplicissimas*  
= *et planas astrophoras.*

Solaris spiritus vibratio, rebus tamq[ue] variis s[ecundu]m  
accomodat ac in illas diuinsi[te] modis agit: Anima-  
lis spiritus vibratio, rebus corporib[us] variis s[ecundu]m accomo-  
dat, ac in illas diuinsi[te] modis agit.

Solis Radij vibratio, in vniuersu claudi alijs non  
potest: Animalis spiritus vibratio, in vniuersu  
alibi claudi non potest.

Solaris spiraculu[m] sua onergoia & essentia in  
rebus terreis mira officit: Animalis spiraculu[m] sua  
praesentia & onergoia in humanis corporib[us] mira  
officit.

Solarium spiritus lapsus in terra, illius phantas-  
tas, sicut vegetat, forat ac reficit: Humanorum spiritus  
lapsus & distributio p[er] corpus, illij phantas-  
tas vegetat, forat ac reficit.

Solis spiritus & Radij, terra, ad suu[m] opus non sump-  
t[us] edigunt: Corporis spiritus humana instrumenta, &c.

De solis beneficio insinuat solum intusmur: De spi-  
ritus animalis beneficio &c.

Solis vibratio inuodiri potest in dorsu foratur:  
spiritus animalis vibratio &c.

Solis in Caelo mira est velocitas & pernicitas: A-  
nimalis & Rationalis motus in corpore mira est  
velocitas, & pernicitas.

Caeli sicut corporis influxus radij tanens est sicut quid  
inoffensiu[m]: Humanorum spiritus influxus radij tanens est  
inoffensiu[m], &c.

Donu[m] solaris luminis de coelo alicu loco, p[er] vniuersu  
in terram orbem spargitur: Donu[m] spiritus ani-  
malis de coelo alicu loco.

Solaris Radij & spiritus triplicem habent sp[eci]em:  
humanorum corporis spiritus triplicem habent sp[eci]em.

4. Quia corpus absq[ue] solarib[us] radiis est inerte: hu-  
manu[m] corpus absq[ue] animali spiritu et radiatione  
est inerte.

## The Seaman's

Luna à solo suo lumen gratis fovet & nutrit, & ut dicitur  
 in resuscit: animalis spiritus vitali suo lumen gratis  
 fovet & nutrit, & ut dicitur in resuscit.

Lunaris Radius abque soli vigore & esse non potest:  
 animalis spiritus abque vitali vigore & esse non potest.

Lunaris Radius variis modis remittit, varia modis atque  
 inquit: animalis spiritus variis modis remittit, varia  
 Lunaris Radius est et sua incrementa solari radio debet: animalis  
 spiritus est et sua incrementa vitali debet.

Lunaris Radius & spiritus à soli potest: animalis spiritus cum  
 sua radiatione à vitali potest.

Crescente Lunari radio, crescit aquarum motus: Crescit et  
 spiritus animalis, crescit corporum & animalium motus.

Plantarum mundum dispensantur actio, & praesentia  
 & ubi tenet est sanctorum necessaria: facultatibus vitam  
 dispensantur, cum sit quas illis ancillantur actio & praesentia,  
 & ubi corporum est.

Naturali Solis facultati quatuor plantas de omnibus  
 magis ancillantur: Naturali humanorum corporum fa-  
 cultati quatuor ministrat maxime ancillantur.

Plantas et etiam solas alias, & mutuo quodam mo-  
 do juvant ac temperant: facultates humani corporis  
 et etiam ut quodam alias, & mutuo est.

Luna & Jupiter impediri possunt salvo solo: ani-  
 malis facultate & naturalis sopiri possunt salvo  
 vitali.

Soli est vitæ congenita & Lunae in est, Lunae  
 Contra: naturalibus corporum instrumentis & est con-  
 genita vitæ inest: animalibus Contra.

Jovialis in Caelo natura, ubi tenet de modo est  
 bonifica: naturalis in homine facultatibus ubi corporis  
 de modo bonifica.

Plantarum mixta est Concordia in discordiis naturis  
 & locis, ad temperanda rationem inferiorum universitatum:  
 facultatibus humanae corporis: mixta in est Concordia in dis-  
 cordiis naturis & locis, ad temperanda rationem Corp: est.

## Primer.

Quoniam totus coeli planities hic insuperabilis semper co-  
munitur: Quilibet humani corporis instrumentu  
tria insuperabilis co.

Et merito & saluare, solis ac lunae harmonia tur-  
bari potest: Et licet flamma & molacchia, vitalis facultas  
-tis, & naturalis harmonia turbari potest ac vitari.

6 Et Solari Regio, qui semper calidus, lux mirra et  
spiritus sanguis officina emanat: Et semper, qui sem-  
per calidus, et nativo calore, spiritus sem-  
per officina emanat.

Solaris calor ab ipso motu & spiritu in nos longius potest  
transire: Nativus calor ab ipso motu & spiritu in nos co-  
-tis, & naturalis harmonia turbari potest ac vitari.

Solis calor cum suo spiritu tenetur fortis ac vegetat:  
nativus calor suo spiritu corpus fortis ac vegetat.

Solaris calor cum suo spiritu coeli et terrae conjugium  
firmat: natus calor cum suo spiritu corporis & animae co.

Ubi solis vaporibus daturus plati, humiditatem daturus  
offundunt: Ubi nativi caloris vaporibus daturus mit-  
-tuntur, qui humiditatem & calorem co.

Sol in quacunque parte terrae, daturus, daturus  
co. habetur & morat: natus calor in quacunque parte  
corporis habetur & morat.

Solaris calor paucis daturus multa in nobis tenetur  
operatur: natus humani corporis calor paucis haurit  
multa in nobis corporis operatur.

Ubi solis calorem desideratur, ibi languida sunt omnia: ubi  
innatus calor desideratur, ibi, co.

Solis per quatuor diadema cardines peracratione, nos terrae  
varie afficit ac morat: natus caloris per quatuor vitas  
astatis peracratione, nos animi & corporis varie afficit ab-  
-munitur.

Solaris calor nobis terrae quod familiaris est, daturus  
-super infundit: natus calor nobis corporis quod est fami-  
-liaris infundit.

Solaris calor omnia fortis & alit: natus calo-  
-omnia fortis & alit.

Et Calores solis, remotas mundi partes tenuerunt caloris:  
a nativi caloris, fons vniuersae, partes partium habent  
caloris.

The ~~Ex~~amane

Calor Calor ubique non est idem, nec ex aequo viget:  
Natus Calor in corpore non ex aequo ubique viget.

Solaris Calor quoadmodum ignis & intolerabilis: Natus  
Calor quoadmodum ignis & intolerabilis.

Solaris Calor actiones varias sunt & opera: Natus Ca-  
lor actiones varias sunt & opera.

Solaris Caloris energia multiplex: Natus Caloris  
energia multiplex.

Solaris Caloris vis mira & monstrabilis visus: Quod  
in minima terrae & aquae: Natus Caloris vis cum suo spiritu  
visus: Quod in minima carnis & ossis potest penetrare.

Solaris Calor & splendor sua praesentia terrae fontem  
ac temperat: Natus Calor cum suo spiritu sua praesentia  
corpus fovet ac temperat.

Solaris Calor temperato fovit temperat: Natus Calor  
natus corporis Calor temperato fovit: Temperat corporis.

Solaris Calor & spiritus, totius terrae facultates om-  
nes ad actionem preparat & operatur: Natus corporis  
Calor una cum suo spiritu, totius corporis et quiescentem  
facultates omnes, ad opus preparat & operatur.

Solaris motu suo & vitali spiraculo totius mundi  
omnes perfundit & inspirat: Cor humanum motu suo, &  
vitali spiritu, totius corporis omnes perfundit ac inspirat.

Solaris motu & spiritu non potest carere mundus:  
Cor humanum motu, & vitali spiritu non potest carere corpus.

Solaris salutarius Caloris ac vitalis est fons:  
Cor vitalis Caloris ac beneficii est fons.

Solaris Caloris actio & praesentia totius terrae confort  
absentia incommutat: Cor humanum Caloris spiritus  
praesentia rebus corporis commutat, absentia incommutat.

Solaris de aliorum partem intemperat & laboribus praepropere  
potest, vel intemperat: Cor humanum de aliorum viscerum  
intemperat & laboribus praepropere potest, vel intemperat.

Solaris in coelo iuxta & iuxta partem habet: Cor in huius  
in mundo corpore partem iuxta & iuxta habet.



Sol aliam stellam ad mimulit virtus in temperanda  
per muni vniuersitat: Cor humilior vniuersitat ad mimulit  
virtus in temperanda vniuersitat vniuersitat.

Sol affluet temperat luna: Cordis affluet temperat cor.  
Sol fuit motu nunquam intermittit: Cor fuit motu cor.

Sol in medio planetarum jacet: Cor in medio  
thoracis jacet.

Solis motu & planetarum sedare nemo potest:  
Cordis motu & arteriarum sedare nemo potest.

Solis labores vobis bonis nesciunt: Cordis  
labores & affectus vobis corporis sumptus incommittunt.

Solis motu & planetarum pulsationis indiget vniuersitat  
vniuersitat: Cordis motu & arteriarum pulsationis  
indiget vniuersitat vniuersitat.

Sol duos habet in corde motus & orbis: Cor duos  
habet motus, & orbis totidem capfulas.

& Saturni in temperatis a temperato fove mitecit:  
Melancolici succi in temperatis a temperato sanguis  
= ut mitecit.

Martis malicia temperat bonis: flavae bilis  
malicia temperat dulcis pituita.

Planetarum motu variis est ac multiformis: humanorum  
corporis motu variis est ac multiformis.

Solis calor vita de proprio spiritu vobis bonis imponi-  
t: sanguinis vapor vita de proprio spiritu vobis bonis imponi-  
t.

Corporum planetarum quatuor magnos usus obtinent in  
temperanda & modificanda vniuersitat bonis harmonia:

Corporum humorum quatuor magnos usus obtinent in  
temperanda & modificanda vniuersitat corporis economia.

Ex planetis duo sunt vobis bonis amici & familiares:  
Ex humoribus duo sunt vobis bonis amici & familiares.

Martis stellae natura aestuantissima est & per-  
niciosa: flavae bilis natura aestuantissima est & per-  
niciosa.

Planetarum radii variis coloribus in nubis appingunt:  
corporum humores in cute variis coloribus appingunt.

## The Goamans

Planetas coelestes certos & peculiarios habent co-  
=lores: humores corporis, certos & peculiarios ha-  
=bent colores.

9 Duo colorum lumina motu & Radio, terra  
illuminant & excitant: Duo corporum lumina  
sive oculi motibus & Radiis corpus illu. et.

Partes colorum stellatas, seu stellat or-  
=bicularis figura prae se ferunt: partes hu-  
=manorum corporum orbicularum or.

Prædiximus colorum partes seu stellas sunt  
quatuor: quarum natura mirabilis: præcipuas  
corporum partes sunt quatuor: et.

Partes colorum seu stellas varias sunt naturæ  
ac temperaturæ: partes humanorum corporum va-  
rias sunt naturæ et.

particulas colorum stellatas omnes cum suis Radiis  
& spiritibus in id incumbunt ut ratione terre universi-  
tate hauriant ac suffundant: particulas humanorum  
corporum omnes, spiritus item & facultates in id incum-  
=bunt, ut ratione corporis universitatem et.

Partes colorum stellatas absque motu & spiritu esse  
non potest: partes humanorum in corpore absque motu  
aliquo & spiritu esse non potest.

Partes zodiaci varias sunt qualitates: partes  
humani corporis diversas sunt qualitates.

Partes colorum seu stellatarum quædam sunt simpliciter,  
aliæ compositæ: partes humani corporis quædam sunt et.

Partes colorum omnes stellatas vixit possunt in-  
=perio & motui: partes corporum omnes partes et.

Partes colorum seu stellæ per omnia sibi non respon-  
=dent, ut similia similibus agunt: partes humanorum  
corporum & omnia sibi non respondent, ut et.

## Quintus.

In partibus terrae, solis vicina, & remotio diversimodè agit. in partibus corporis, conditis vicina & ex-  
-partibus seu stellatarum, tam simplicium, quàm compo-  
-situm, qualitates sunt diversae: partibus corporis tam  
-simplicium quàm compositum.

Partes terrae à tribusq; in coelo sunt, adq; tantis  
-fororibus, ac sustinentur: partes corporum à tribusq; gas  
-in corpora sunt, vobis: &c.

Sol & planetæ, coeli Reges videntur: cor et  
-viscera, corporis particulis videntur:

De commixtionis affectionum planetarum, vos terrae  
-statu seu fortitudo: De commixtionis affectionum vis-  
-cerum vero corporis fortitudo: &c.

Stellæ & ignis elementis videntur: humanæ mor-  
-tis spiritibus videntur.

Partes coeli tametsi diversis mixta inest sym-  
-phoniam de totius mundi custodia: partibus corporis  
-tametsi diversis mixta inest symphoniam, ad unum  
-corpus custodiam.

In duabus maioribus coeli stellis terræ tamq; modifi-  
-catio & vita maxime continetur: in duabus maioribus divi-  
-sionibus corporis modifi: &c.

Partibus coeli seu stellatarum summa est varietas & diuer-  
-sitas: partibus humani corporis summa est &c.

Partes coeli seu stellæ propria sua temperatura & na-  
-tura prorsus non exant: partes corporis propria sua  
-natura prorsus &c.

Partibus coeli stellatarum numerosa multitudo  
-inter se conciliis invicem converit ac se mutuo temperat:  
-partibus corporis numerosa multitudo inter se &c.

In zodiaco initium est & finis: in humano corpore, est  
-partes zodiaci variis sub diversis qualitatibus digestis  
-vultus: partes & summa: corpore variis sub diversis tempera-  
-mentis digestis vultus.

## The Sphaera

Particula colorum stellata, seu stellae, quomodo  
 = tricat, figurae vero omnes sursum describunt:  
 particula humanorum corporum, quomodo tricat, figurat  
 vero omnes tam in hoc mundo quam in aliis variis designant.  
 Partium coeli seu stellarum rerum, figurarum, actionum &  
 temporamentorum variae inter se differunt: partium rerum:  
 Corp: spirituum actionum, & temp: etc.

10 Solis & Luna per Zodiacum egressio, & tem-  
 = peratib: temporamentis differunt: excitat: vidg huma-  
 = na per hunc mundum egressio, quatuor aetatib: temp: er:  
 Coelest: Corp: quod constat aetatib: mutatur:  
 humanum corpus per eas aetatib: mutatur.

11 Septem coelestium planetarum sphaerae,  
 septem luculentos orbiculos continent: septem hu-  
 = manorum orbium sunt oculorum tunicae luculentos or-  
 = biculos 7<sup>os</sup> & circulos continent.

Orbit planetarum septem, & stellati illorum globuli,  
 totidem optimo quodam modo in cludunt: orbium huma-  
 = norum tunicae 7<sup>ae</sup> & circuli etc.

Orbicularum colorum stellati duplices habent motu  
 proprii manifestum: orbis humanorum corporum dupl-  
 icem etc.

Orbit colorum super uno axe moventur: orbis cor-  
 = porum super uno axe moventur.

Colorum finis habet ac interiori: humanum corpus  
 finem habet ac interiori.

— concludam in microcosmo macrocosmum  
 in esse: & contra ipsum humanum corpus magnum  
 cum colorum commercio, & harmonia mixta admirabile  
 habere.

Primer.

12 prout conditorit sapientia, virtutem,  
ac prudentia in utroque ad qualem volucro.  
Quonia id quod de deo cognoscitur, potest manifestum  
est in ipso.

Let us know how far what we ought to know  
is contained in the letter. 1. As by the confusion of  
consonants, came almost infinite varieties of letters;  
but all may be reduced unto two Alphabets: our  
own English letters like to the Latins; including  
all other alphabets of letters, read from the  
left hand towards the right hand. And the  
originall Hebrew including all other, read from  
the right hand towards the left hand: 2. So  
from the depraved nature of man in origi-  
nall unrighteousness & disobedience came that  
great Rebellion of the flesh against the  
spirit: but may be reduced by these two Al-  
phabets of words; whereof the first is to be  
read upwards considering every syllable  
in the quantity, relation, place, time, manner  
& forms; 2. by the genus, species & difference;  
and the naturally; but 3. more morall; in  
their proportion, quality, action & passion:  
and 4. in the affections of the heart; the  
virtues of the mind; the inward sense  
& faculties of the soul; and by the second  
alphabet of words, which is to be read downwards  
as descending by the heavenly  
grace, & ascending from the morall de-  
fect unto the divine virtues & graces:

The Span and Primor.

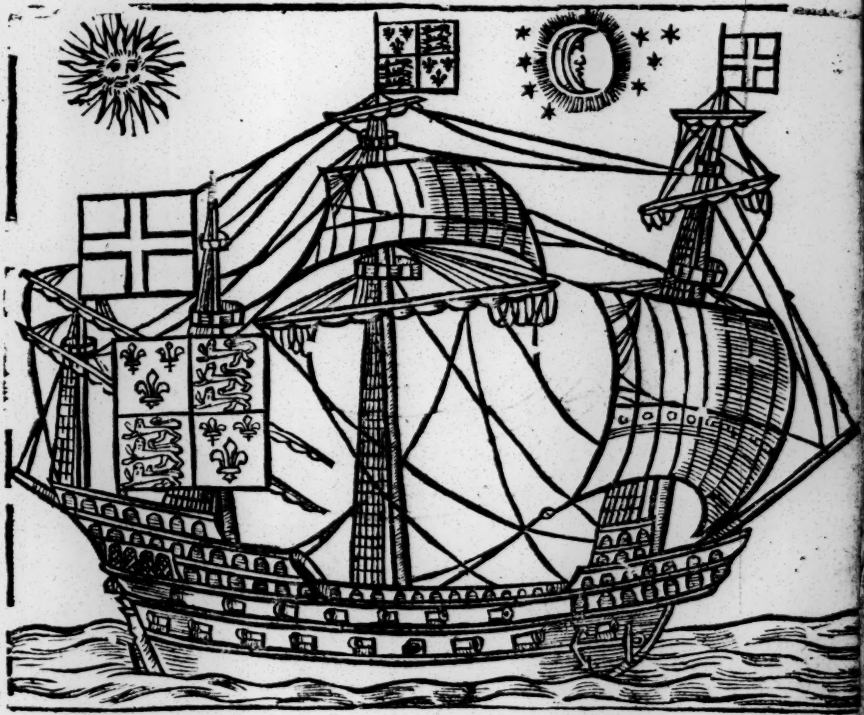
Thou passing from grace unto grace;  
though we navigate the Span, be not  
learned yet where thy holy ghost is pilot,  
no learning can be taking, to bring us to  
thy desired port where we shall be made  
eternally happy. know thy love of God  
to us ward, in thy merits of his blood, in  
whom he is well pleased with us;  
and unto all with 3 persons  
in thy unitie of 3 persons  
be ascribed the glory  
all that is good  
for ever  
amen

finis.

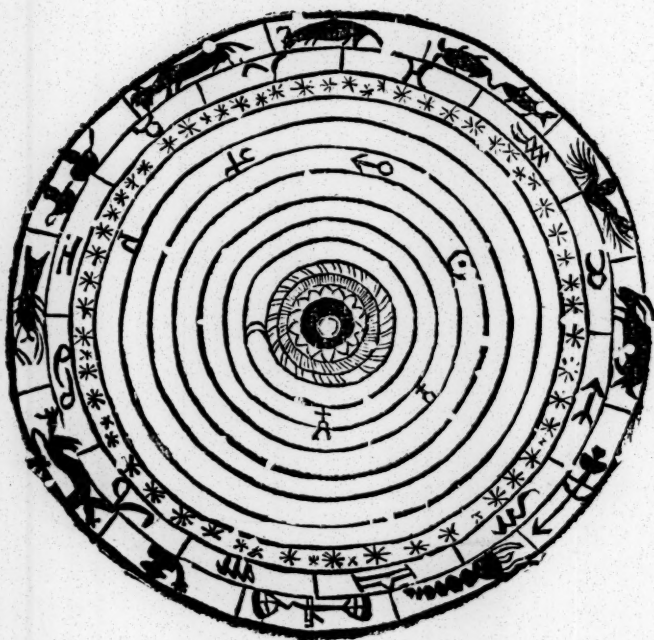


A  
FRIEND TO NAVIGATION

Plainely expressing to the capacity of the simpler for  
the whole mistery or foundation of the same Art, for  
*whose sake, the Author hath onely penned this Trea-*  
*tise, being himselfe a faithfull good willer thereto.*



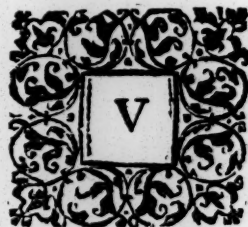
Printed at London, by T.C. 1628.





TO  
ALL THE MOST  
NOBLE AND GE-  
NEROVS SEAMEN

of England, happinesse in  
*this life, and eternally in the*  
Heauens.



Rania hauing brought mee  
(Right Noble) to the sight  
of your most admirable Art,  
I could not choose but say,  
none could doe so great a  
worke, but the maker of all  
things. And seeing it framed of so many excel-  
lent peeces, to say; none but the Diuine pro-  
uidence can vphold it: Whereupon I endea-  
uoured to inable my selfe in some knowledge  
thereof; and (though poore) I Purchased some  
bookes, and in diuers yeares bestowed much  
mony; imploying my ~~idle~~ houres that I could

*I thought vnder  
in vnderstand  
ing  
our my  
house*

*The Epistle Dedicatorie,*

spare in this studie and practise. And in the  
meane time, much sicknesse, and death of my  
friends, bringing mee vnder ~~an~~ intollerable  
bondage ~~and~~ ~~making~~ ~~me~~, made me  
come neerer this Honourable City; but with  
the losse of almost my whole estate: and in the  
way had both my Bookes and goods, all lost  
and spoyled in the *Thames*, water. Neuerthe-  
lesse (although almost vtterly vnabled and vn-  
learned) I haue not ceased to do good if pos-  
sible I might (knowing that no man is borne  
for himselfe.) Therefore I set forth in a bill at  
my dore, to Teach the Art of *Navigation*, to the  
poorer sort *gratis*: And not so content I haue  
here framed a good order there of (as I think)  
to send abroad to those that cannot come to  
me. May it please you therefore vnder your fa-  
uourable ~~consent~~ ~~and~~ direction, to admit it  
your presence once onely: to aske you leaue,  
and to giue you account what I doe among  
your seruants as is most meete. And for your  
fauourable entertainment of it, your ~~kind~~ re-  
spect to me for my good will, and your kinde  
acceptance, I rest,

*Your Honours seruant  
to be commanded,*

John Skay.

of some  
citizens

fact

not scarce



To the Ignorant and Honest  
Reader.



*Honest Reader, this worke intended for thy good, dispise not, but rather accept it thankfully, seeing if it were better I would haue giuen it vnto thee; and more, while I liue I rest all wayes ready to do thee what good I may. Thou hast here ten Chapters: The first is of the Cosmographicall discription of the world: The second is of the measure of the heauens: The third of the Elements: The fourth is of the ground of the Art, The Instrument, Astronomicall propositions, with the Geographicall ~~discription~~, and Hidrographicall description of the Earth and Sea: The fift Chapter is of certaine considerations briefly set downe: The sixt is of Shipping and going out of the Harbour: The*

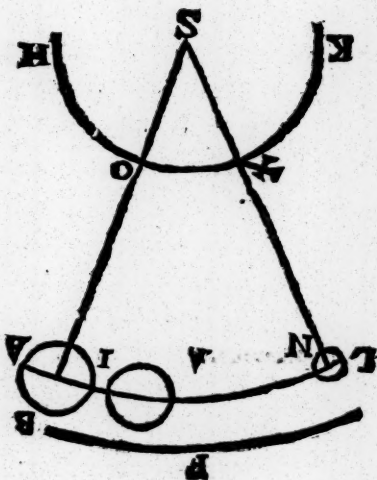
# To the Reader.

seventh of the iournall obseruation and proiection:  
 The eight and ninth is of propositions of Nauigation  
 Arithmetically, Geometrically, and Instrumental-  
 ly shewed: The tenth is of the motion of the Moone,  
 and of comming into the Harbour. If thou profit by  
 it, giue God the glory, to whom be praise for euer,  
 Amen. Vale, From my house in Saint

Thomas Spittle, May the first,

1628.

John Skay.







# A FRIEND OF NAVIGATION.

## CHAP. I.

*Of the Cosmographicall description of the World.*



That which the onely wise God made for mans behoofe, euen all the world of nothing, *Genesis* the first, is said to be round by all moderne Writers: it is proued by reason, and the holy Scripture saith it, *Psal.* 98. It was diuided in two parts by the same God, the part seene, and the part vnseene: But by faith search the Scriptures, there is the part and vie in this our

Christian Nauigation discovered.

The part seene is well defined to bee a Booke, In which wee may see and learne to praise God in his workes. And is said to bee of two parts, Celestiall, and Elementall: In the Celestiall part may be considered the Arts, as Musicke, the harmony of the Spheres: of Soule and Body, for whose health Phisicke is next, in which we consider that Miraculous Medicine of preserving life, be it Philosopher stone, Salt, Virgin-earth, or other denomination, or Mathematicall, as the knowledge of Points, Lines, Circles, Signes, Constellations, Planets, and their Influence and power ouer bodies Elementall.

It may be said and that by good reason, I should begin at the Centor of the Earth, & so consider of the things contained therein,

in, with the Sea, The face of the Earth and Sea, and the things thereon; The Aire couering the other two, and the Fire inclosing them all, making one round body of these Elementall parts, being as a Centor to the rest, and so passe vpwards vnto the first mouer, shewing the relation and agreement they haue together, I liuing now nearer the Centor of the Earth (as it is obserued) by many thousand miles. But if I end my worke so high may bee proud (as some are) or dazelled in the Celestiall brightnesse, being mortall, be cast downe with *Phaeton*.

In the name of God therefore, and in his feare, I will begin with the first mouer, which going with great violence, turneth the whole frame of the heauen within it, round in 24. houres, from East to West: Which heauen is said to haue no impressiō in it, being almost invisible, yet carrying the light and darknesse, making difference of time in daies and nights, according to the difference of Longitude and Latitude of places on Earth.

In it are all the circles and points in the whole fabricke of the world said to be described, their plaines defending and meeting in the Centor of the Earth, or on their other Centors.

The two principall points, are the two poles of the world, the North pole eliuated with vs heere at *London* 51. degrees, 30. or there about; and the South pole is right opposite to it, Therefore depressed iust as much (vnder the horizon of which I will speake anon.) These two points are fixed fast and vnmoueable, betweene which and through the Centor of the Earth, there passeth a right line, which is called the Axe-tree of the world on which it turneth.

Now we must consider both this right line, and all other right lines, cords, signes, great circles and paralels, to be diuided into 360. degrees, each degree subdiuided into 60. minutes, each minute into 60. Seconds, each Second in 60. thirds, &c. as the case may require.

The Horizon is a great circle, whose Centor is in the middest of the Earth, and his plaine reacheth not onely to the face of the Earth, diuiding the vpper part from the lower, the day from the night: But through the Orbes of the planits and fixed starres, euen to the first mouer. This circle hath two poles, one is called *Zeneth*, and

and is right ouer our head, from the which if a right line passe through the Center of the Earth, touching the concave superficies of the first Mouer, it pointeth out the other Pole, called **Mador**. In this Circle we count the Amplitude of the Sunne or Starres, and the Point of the Compasse or Wind. All the Circles called Azimuthes, crosse the Horizon at Rectangles and passe through the Poles thereof: His Parallels are Circles of Altitude, in which are obserued the position of the Planets and fixed Starres aboue the Earth, at all howres of the day or night: Or Circles of Depression diuiding the length of twilight.

The Equator is a great Circle, deuiding the World into two equall parts, the North part and the South: His parallels sets out the Latitude of places on Earth, and declination in the Heauens. All the Meridians doe crosse the Equator at Rectangles and go through the Poles of the World. On this is counted the Longitude of places on the Earth or Sea: For euerie 4 of equall time made by the equall motion of the Equator doth make 1 degree. And 7 deg. 30 min. of Longitude, either East or West, doth cause  $\frac{1}{2}$  houre difference in time of day or night, and they that dwell 15 or 30 deg. East haue it 12 or 11 a clocke, when we haue it 10 or 11, and those that dwell so much West of vs, haue it 10 or 11 when it is midnight with vs. Those that dwell at the East part of our Horizon haue it noone when it is but 6 in the morning with vs, and when it is noone with vs, it is 6 at night with them, but with them in the West part of our Horizon it is 6 in the morning. Our Antipodes haue it noone when it is midnight with vs, and when it is Summer with vs, it is Winter with them.

All other Circles not yet named are likewise supposed to bee in the first Heauen, as in the rest of the inferior Orbes, of which we suppose 11 after *Maginus*. And to good purpose: For the Lord of Heauen and Earth hath so layd the Foundations of the Earth that they cannot be moued, *Ps. 24. 2.* Though *Copernicus* to bring some good purpose about hath imagined so.

Let the tenth Heauen be (if you please) the Waters aboue the Firmament, for ther are so, *Gen. 1. 6, 7.*

*Of the measure of the heauens*

**T**He Zodiacque is a great broad circle crosing the heauens, like a bandilere or girdle, of 12<sup>d</sup>. broad at the least; in the midst whereof is a little circle called the ecliptique line, which crosseth the Equator at two opposit points, swarueh from it 23<sup>d</sup>. 30. at the least, as I haue found by obseruation this present yeare 1627. So the poles of the Ecliptique are distant from the poles of the world 23<sup>d</sup>. 30. by reason of his obliquitie: Betweene which poles there passeth a right line or Axetree on which the second mouer or tenth heauen is carried in his owne motion (contrary to the first) from West to East, and is moest slowe, making his reuolution in 3434 yeares, and 10. daies.

The third mouer or ninth heauen, hath his two poles in the two points of the equator and ecliptique, and his motion is from North to South: making his reuolution in 1717. yeares and 5. daies. But it will be sufficient for our necessary vse here to obserue the motion of the 8. Sphere, wherein are all the Celestiall bodies of the fixed Starres placed: whose motion is from West to East, (some say but one degree in 100. yeare. But the Planets moue in their Orbes in lesse time, as Saturne  $\text{♄}$  in 30. yeare,  $\text{♃}$  Jupiter in 12. yeares,  $\text{♂}$  Mars in 2. yeare,  $\text{♁}$  Sol in one yeare,  $\text{♀}$  Venus and  $\text{☿}$  Mercury like  $\text{☉}$ , Luna  $\text{☾}$  in a month from West to East.

Diuers learned Mathematicions haue set downe the magnitude of the Starres to be farre bigger then the earth: making 6. differences in bignesse be sides duske and obscure. The Planets also are said to be of diuers bignesses and distances. The Orbe of  $\text{♄}$  is in thicknesse 19604454  $\frac{6}{17}$  miles, and his distance from  $\text{♃}$  78721 m. The Orbe of  $\text{♃}$  1892654  $\frac{6}{17}$  m. His distance to  $\text{♄}$  78721. m. That of  $\text{♄}$  26308800. m. his distance from  $\text{♁}$  15725. m.  $\text{♁}$  343996  $\frac{6}{17}$  m. His distance from  $\text{♀}$  23437  $\frac{1}{2}$  m. The Orbe of  $\text{♀}$  3274494  $\frac{6}{17}$ . Her distance from  $\text{♂}$  12812. m.  $\text{♂}$  Orbe 253372  $\frac{1}{2}$  m. His difference from  $\text{☉}$  12812, The  $\text{☉}$  to be in bignes 105222  $\frac{6}{17}$ , her distance from the earth 15750. m.  $\text{♄}$  his bignesse compared to the Earth is as 95. to 1, and his distance to the Firmament

120445. m.  $\odot$  his magnitude to the Earth is as 166. to 1. & as 91. to 1. And  $\delta$  as 2. to 1. And the distant from the Firmament to the Earth 358463 $\frac{1}{2}$ . m.

It hath appeared manifestly that both by Sea and Land, who so trauaileth 60. miles on a great Circle, althet a degree in his Trauaile: which taken 360. times the number of the whole circle, maketh 21600. miles the compasse of the whole Earth and Sea. The Diameter then will be 687 $\frac{8}{11}$ . the semydiameter 3436 $\frac{4}{11}$ . m. which maketh the firmament to be from the Center of the Earth 361899 $\frac{1}{11}$ . Therefore it seemeth there is something to worke vpon to measure these things by.

Likewise I may say, considering that from the earth to the Moone is 15750. miles, and the  $\text{C}$  is the lowest Planet. Therefore the two vppermost elements of Ayre and Fire are both together 15750 mi. in thicknesse: Againe, because the hill Atlas is said to reach to the midle region of the ayre, that hill (which I take to be Teneriffe) may easily be measured, and so the measure of all the rest is had.

The motion of the Eccipticke causeth other foure circles to be described, two are described by the motion of the Poles thereof, being distant from the poles of the world 23. degrees 30. min. making two round circles about them: that next the North pole is called the circle Arcticke, the other is called the circle Antarticke. The other two are described by the motion of the two Tropicall points of the eccipticke, that on the North side of the equanox is called the tropicke of Cancer, the other is called the tropicke of Capricorne. The Zodiacke is diuided in 12. equall parts, beginning at the one intersection of the same with the equanocstial circle, and so going round: And these are called the 12. signes of the Zodiacke, for as much as they extend them to the full breadth of the Zodiacke, and are the cause thereof.

There are two other circles also of speciall vse in this Art, one is the Equinoctial colure, the other is the Solstitial colure: These two are great circles, the first parteth the Equator and Zodiacke euen, so as the North signes are from the South signes parted by the first point of the first signe, and the first point of

the seauenth signe : and these signes are called Aries  $\gamma$ , and Libra  $\text{♎}$ , beginning the Spring and Autumne, the other passerth by the two tropicall points of Cancer  $\text{♋}$ , and Capricorne  $\text{♏}$ , making the beginning of Summer and winter ; both passing through the poles of the world, parting the Zodiacke in foure equall parts, and the equator also with all his paralels.

The first point of  $\gamma$ , beginneth the Spring : that is, when the Sunne in his motion commeth first to that point, and going through three signes  $\gamma$ , Taurus  $\text{♉}$ , Gemini  $\text{♊}$  : then comming to the first point of  $\text{♋}$ , beginneth the Summer : and passing through other three signes  $\text{♋}$  Leo  $\text{♌}$ , Virgo  $\text{♍}$ , so comineth to Libra  $\text{♎}$ , Scorpio  $\text{♏}$ , Sagitarius  $\text{♐}$ , to the first point of  $\text{♏}$  : beginneth the winter, from thence through  $\text{♏}$ , Aquarius  $\text{♒}$ , Pifles  $\text{♑}$  making the whole yeares reuolution. And these 12. signes are called Constellations, and there are other Constellations, some North, some South, in which is had a number of Starrs bearing names, according to their nature : and these constellations beare rule ouer diuers Regions, Countries and Cities.

Now we may passe the Orbes of the other superiour Planets, & onely note their friendly aspect as we passe by them : And consider the  $\text{☾}$  motion with the  $\text{☉}$  for the Eclipses of vs, for finding of longitude on earth or Sea. Her monthly motion, full change and quarters, for the ebbing and flowing of the waters, spring and nepe tides : her aspect with the planets, good or euill, for Physicke : Her place in the Zodiacke, for blood letting either for Man or Beast.

### CHAP. III.

#### *Of the Elements.*

**F**ire is the most noble and superiour of all the Elements, pure, subtle, most spirituall, putting heat into all substances, light-some, hauing motion Lionous, choloricke. Ayre is diuided into three Regions, that next the Fire is most hot, that in the middle most cold, vnto the which some hill tops doe clime, as hath been seene, the lowest is that in which wee liue, the Clouds and the Fowles



Fowles doe flye, which God of his mercy make wholefome vnto vs. *God said let the waters under heauen be gathered into one place, and let the dry land appeare, Gen. 1. 9. And God called the dry land Earth, and the gathering together of the waters, he (euen God) called Sea, ver. 10.* Sea, which together with the earth make one huge massiue body, round, as may be proued by the artificall Globe; : but mosttruely by a perfect Artsman, who vsing his skill in his Trauell, both by Sea and Land, is able to salue such small irrregularities, as high tydes, lowe ebbes, high Mountaines, lowe Vallies : For experience is the mother of Acts, and that *may partly conceiue in this* (i hauing a brother in Saint *Christophers* Isle of the West Indies, who hath sent me Letters from *Meriors Hope* there) I went to *Gresham* Colledge in *London* of purpose to looke on the biggest Terrestriall Globe they had, and found such an Ile to lye in some 16. deg. of North Latitude, and in 321. deg. of longitude, or there about : But there I could finde neither Cape, nor Bay, Port nor Hauen ; therefore no vniuersall Map will serue that turne : And Master *G*, being there with mee at that time, made a doubt, saying : How know I that Saint *Christophers* Ile lyeth there except I had scene it, or know some body that had bin there ? meaning no doubt some Arts-man, who (I confesse) may not onely obserue the longitude and latitude ; but may also set out the Capes and Bayes, Ports, Bounds, Riuers, and giue the dimention of the superficies.

Of the innumerable multitude of creatures in the Sea, and of her riches, I will not speake ; but the artificall making and vse of Shipping therein is admirable, as may appeare in the whole Art of Nauigation : A wonderfull secret thereof is the variation of the compasse ; a cause thereof is imagined to be the hollownesse of the Earth or depth of the Sea, and for that nature abhorring emptinesse, the excellent vertue of the Load-stone doth alwayes draw towards it in all places, where the needle being touched therewith shall draw most neere ; but I thinke it is a speciall gift of God, sent for mans vse, but farre aboue his knowledge. Sea and earth are diuided as the heauens : the beginning of the Equator or first Meridian being with Saint *Michael* and Saint *Maries* Iles, the circle of the equator passing by

Saint Thomas Ile, *Abasania*, the famous Ile of *Sumatia*, *Bornio*, *Papoo*s, *New Guinny*, *Guiana*, and so round, from Meridian to Meridian Eastward we count Longitude on any paralell: but Latitude is counted from the Equator towards the Poles of the World on the Meridian or colure. The Paralels sets out the Zones and Climates.

Of creatures without life, or such as are in the earth onely, are Gold, Siluer, precious Stones, Minerals, Mettals. But the Bodies which shall one day rise againe, are chiefly to be considered. Of Creatures with life, some are fixed, as Plants, Hearbes, Flowers, Spices, Trees, bearing fruit, without fruit. *Gen. 2. 19.* Out of the ground God formed beasts and fowles: and in another place it is said *All flesh is grasse*. Therefore of mouing things some are in the Earth, as Wormes, Serpents, Moles, Conies: some in the Ayre, as Fowles: in the Water, as Fishes. Monsters on the face of the earth, as all manner of Beasts and Cattell wilde and tame. The most excellent thing made is man (a shame for him to become so wicked) *Being wonderfully made, Psal. 139.* an epitomy of the whole World; to seeke and set forth Gods glory: surely flesh and bloud cannot set forth his glory, whose workes doe amaze the senses of the most learned: Therefore be not proud O ye learned, nor vaine glorious O ye wise; but seeke and set forth Gods glory, that the vnwise and vnlearned, may see, marke, and learne: and be incouraged O thou that art ignorant (of which I am chiefe) to see the workes of the Lord in heauen and in earth, and his wonders in the deepe Sea, *Ps. 107.*

#### CAHP. IIII.

*The ground of the Art, the Instrument, Astronomycall propositions, with the Geographical and Hydrographycall description of the Earth and Sea.*

Reason doth teach, and this 36. yeares experience I haue had, that to the gaining of these knowledges, quantitie is to be considered, either Geometrically or Arithmetically, or most vsually of both together. Arithmetick is the Art of numbering, and  
euery

euery number is expresse by certaine Characters, figures, and Ciphers, as : 1, 2, 3, 4, 5, 6, 7, 8, 9, 0. or : 2<sup>s</sup>. 3<sup>d</sup>. 30. 50. or :  $\text{C} + \text{L} + \text{X} = \text{CC}$  to 80. But the figures and Ciphers whether they be abstract or contract, haue a double signification to expresse them, which is called their numeration, Psal 90. ver. 12. *O Lord, teach vs so to number our daies, that we may apply our hearts vnto wisdom.* Figures do either signifie them selues onely, as 1. is one, 2. is two, &c. or are valued according to their place : Position of this kinde is knowne as men read the Hebrew tongue. This Art giueth the numerall solution in all dementions, and hath these kindes : Addition, Subtraction, Multiplication, Diuision; and these all haue a diuers property in their vse, either in working proportion, or otherwise. Another Arithmatique there is (not of numbers) but of parts of number, hauing like species, properties and passions, and fetch either their beginning from vnity, but with a difference, for as number increaseth in multitude infinitely : so doe Fractions decreaseth infinitely but most commonly, as in this worke, they are compound : for if I take in account of Time, Motion, Measure, Signes, Degrees, Minuts, Seconds, &c. As in reckoning of the  $\text{C}$  place, Thus : suppose the  $\text{C}$  in the day of  $\text{C}$  to be in the first degree of  $\gamma$ ; and at 20. daies old, I would know her place; say if the  $\text{C}$  go in one day 12. degrees from the  $\odot$ , and the  $\odot$  goe each day one degree, Therefore the  $\text{C}$  goes in 20. dayes 260<sup>d</sup>. which diuided by 30<sup>d</sup>. giueth 8<sup>s</sup> : 20<sup>d</sup>. where 8. is the number 20, the Fraction, and his place the 20<sup>d</sup>. of Sagitarius : But where deg. are taken for numbers, there Minuts, Seconds, Thirds, are Fractions : as 15<sup>d</sup>. to an houre 4. to a degree, or 20<sup>d</sup>. is as much as one houre 20 : or 20<sup>d</sup>. 50. 30. is as much as 1250 miles  $\frac{1}{2}$ ; and generally all circles and paralels, are numbered with these kinde of Astronomicall Fractions or numbers.

Geometry giueth a punctuall termination to all dementions, either in length, bredth, or thicknesse : which number many times cannot dee; as in diuiding a line by extreame and meane proportion. But number and parts do helpe Geometry to expresse the quantitie, bee it in length, bredth, or thicknesse. Linneementall as angles right lined, or Sphericall : & may serue to tel some distance  
in

Instruments necessary in any worke, are of necessity, and to this worke which containeth so many Arts, it may be objected that one poore though of a good capacity shall be neuer able to attaine. Say not so man, for the best instrument in any worke is a willing minde: Again, shall I be ashamed to indeuour to doe well, because some more learned then I, will despise my simplicity and weaknesse in knowledge? No sure, the vertuous will commend it, God bee thanked there are as many good Instruments as Arts, let euery man bee content with such as hee hath, and God no doubt will blesse the good indeauours of the godly honest. 2s. 6<sup>d</sup>. on a paire of Compasses, and two pence or a straight ruler is not much: with these thou maiest beginne in spending some spare houres time to worke thus: first make a circle, diuid it in 360. parts, or  $\frac{1}{4}$  into 90, and besides abundance of necessary conclusions, which the malicious ignorant will not belceue, these following are not the least, and are most meet to be knowne: Radius or any signe, cord, arke, Tangent, Secant, great circle, parralell: example: I did take the  $\odot$  height, *May* the 26. 1627. and so found his declination 22<sup>d</sup>. 30. North, his place being in 15<sup>d</sup>  $\pi$ . right ascension, 61<sup>d</sup>. 30. difference ascensionall 28<sup>d</sup>. 15. height of the North pole 51<sup>d</sup>. 30. Amplitude 37<sup>d</sup>. 30 North. oblique ascension 33<sup>d</sup>. 15. semydiurnall arke 118<sup>d</sup>. 15. semynocturnall arke 61<sup>d</sup>. 45. his course from rising to his setting, 15 houres 46. length of twilight 8 houres 14. length of the night darke 0. houre. Likewise about December the 12. 1627.  $\odot$  place 0<sup>h</sup> merid height 15<sup>d</sup>. declination 23<sup>d</sup>. 30. South, amplitude 40<sup>d</sup>. 30. south, right ascension 270<sup>d</sup>. oblique ascension 298. deg. 30. difference ascensionall 28. d. 30. Likewise may the fourth 1629. suppose the sunnes place which is his longitude, found by the rules before: going to be 53. d. or the 23. of  $\alpha$ . in the latitude of 51. deg. 30. min. his merid. height is found by these rules to be 55. deg. declination 18. deg. north, amplitude 28. north, right ascension 50. deg. oblique 27. deg. difference ascensionall 23. deg. semydiurnall arke 7. hou. 32. min. semynocturnall arke 4. hou. 28. min. length of twilight 2. hou. 4. min. from noone to euening shut in 9. hou. 33. min. length of the day 19. hou. 6. min. night darke 4. hou. 54. min. Son rise at 4. hou. 28. min. setteth

setteth at 7 hou. and 32 min. Sun above the Horizon 15 hou. 4 min. vnder the Horizon 8 hou. 56 min.

And here remember, that, *The workes of the Lord are great, sought out of all them that have pleasure therein, Ps. 111. 2. The mercifull and gracious Lord hath so done his marvelous workes, that they ought to be had in remembrance, v. 4. The Lord is high above the Heavens, Ps. 113. 4. Who is like the Lord our God, that hath his dwelling so high, and yet humbleth himselfe to behold the things that are in Heauen and in Earth, v. 5. He taketh the simple out of the dust, v. 6. The Heavens declare the glorie of God, and the Firmament sheweth his handiworkes, Ps. 19. 1. As Arcturius Orion pleades the hidden Chambers of the South, the great Leviathan that moeth in the water, but beyond all our Redemption in Christ, God commanded *Nah* to build an Arke, and to build Shiping were but vaine except God blese it and bee the Sea-mans guide. Say then, is it not a great blessing we receiue from him in guiding our Ships and Selues both by Sea and Land with such excellent Rules of Art: Surely the learned in the Geographicall, Hydro-graphicall and Nauticall Sciences must needs confesse it, especially those that trauell.*

Neither need any be so sottish as to thinke it a shame to spend ten min. of his idle time euerie day to some such good purpose, which may add him more comfort perhaps in distresse, then all the friends in the world besides. By the Scale made on a straight Ruler and Compasses distance is had easily without measuring to them, for make a Circle and diuide it in foure equall parts with straight lines over the Centor, then diuide  $\frac{1}{2}$  in two equall parts, and ech of them in 3 then againe these subdivisions in 3 and lastly those into 5, so is one quarter of the Circle diuided into 90 deg. by the same reason you may diuide a right line as your Ruler into Foots, ech Foot into Inches or Tenths, ech 10 into 2. 3. 4. 5. 7. 11. 12. 16. 20 parts or what you please, and then begin to worke thus, Imagin to stand on some Hill as at High-gate, from thence to all the highest Hilles round about you cast your eye, and by your Circle diuided you may take the quantitie of the Angle from your eye to the two next Hilles from you and neereft one to another. Suppose that Shutors Hill and Purfleet



Hill doe make an Angle of  $\frac{1}{4}$  of the quadrant or 30 deg. Or Harrow Hill and Saint Albones make an Angle of 40 deg. and the distance between High-gate and Shuters Hill to be 10 mil. more or lesse, and from High-gate to Harrow 12 mil. you shall goe to Shuters Hill and obserue the Angle between High-gate and Purfleet, be it right or oblique, acut or obtuse make 2 lines, whereof one to be laid downe by the Scale on your Ruler of the iust distance between your 2 first stations, at the one end make the first Angle, at the other end make the other looking one towards the other, and the two lines continued will point you out Purfleet, doe so by the other and it will point you out Saint Albones, then by your Scale you may know their distance, hauing them distances you may easily find all the distances and angles of position or situation of all the Hilles, Townes, Riuers, Borders, in any one Countie, and from thence ye may doe the like by the rest, and so take a true surueigh of a Kingdome, and of all the Iles, & Rockes in the Sea, and Kingdomes adioyning, as Scotland with his Iles, and ouer the Sea, as Ireland with his Iles, likewise from Douer to Callice, and so take the Countrey and Kingdome of France, with his Riuers, Iles, Rockes, and euerie remarkable thing that commeth in view of your eye.

But note, that if you measure such great distances, you must haue regard to Longitude and Latitude, for if you shall measure from France to Spaine, Portugale, and so ouer the mouth of the Straits of Guibralter into Barbarie, Guiny, by the Coast of Saint Thomas Ile, Monomotapa, Cape Good-hope, the Coast of Saint Larence, Mosamque, Prester Iohn, the head of the ancient Riuer Nilus, the Arabian, Indean, Notalia, Grecian, Italian Countreys, so come to Germany, Polonia, and all those North parts to the Pole if you can, or to Sweden, Moscouia, and the North part of Tartaria, and that way discouer all the North parts round about the Pole, and so if you can come into North America, if not, then come ouer Land neere the Caspian Sea, Parthia, Persia, Ormus, Gufarat, Goa, Cochin, and all the Iles to the South thereof, the Gulph of Bengala, Malaca, Sumatra, the Strait of Sunda, Iaua maior, Iaua minor, new Ginny, Papoos, Hiland, Timor, so to Beach, and to the discouerie of the parts of Maletor Kingdome



to the South Pole if you can, or by the Moluccos, Bornea, Cambia, Cochin China, Iapan China, to Cathay, from thence East a little North to the Straits of Annian, and so into the most West-erly parts of North America, Portray all that new world, to be short, come by the Gulph of Mexico down to the Strait of Land called Noua Hispaniola to Peru, goe ouer the Strait of Magilana and discouer all the vnknowne Land round about the South Pole.

Which thing may be done by Gods permission no doubt, and when thou halt done this most truly, with all the Coasts of the Seas, thou wilt say the circompherence of the Sea is also had: True, yet neuerthelesse ye shall neuer be able to lay the true semetry of both Earth and Sea on a plaine superficies by this way.

The like may you proue by the Hydrographicall discription of the Sea, by the common Sea Card. And here note, that this may serue likewise to proue that the Earth and Sea make one round Body.

#### C H A P. V.

*Of certaine considerations to be remembred, briefly set downe.*

**A**S I conceiue, there are these three things to be considered, without which sayling cannot be performed. The first, is an exact obseruation of the Sunne, Moone, and Starres. The second, is the perfect finding out of the variation of the Compass. Lastly, a true reckoning of the Ships way. These all doe helpe one another, and should be precisely had. Againe, the Earth and Sea making one round Body, we may consider that to sayle between 2 places, may be either by a Parralell, a Rumbe, or a great Circle, as ye may perceiue by the artificiall Globe. Therefore if ye can draw some blanke Charts to carrie with you in your voyages, such whose Meridians and Parralels beare such proportion one to the other in ech Latitude, as those in the Globe, you shall doe well.

In the Globe you may perceiue the degrees in the Equator to agree and be equall with the degrees in the Meridian. Now the

degrees in the Meridians are euerie where equal, but the degrees in the Parrals to the Equator are lesse and lesse, so that a degree of Longitude in the 60 deg. of Latitude is but  $\frac{1}{2}$  of that degree of Longitude in the Equator, and as the whole signe is to the number of parts in a degree of Longitude at the Equator, so is the signe of the complement of any Latitude to a fourth number (by the rule of proportion or geometrical demonstration) which number tels you how many parts of a degree of the Equator serueth a degree of Longitude in that Latitude, but in a plaine Card where the Meridians are all Parrals, there because the degrees of Longitude in ech Latitude are equal, you must increase the degrees of the Meridian in ech Latitude in such proportion as is aboue said, which is easie to be done with the Scale on your Ruler.

This to looke on to the eye will be strange, and to such as loue to sticke to their old errors, in the plaine Card they will thinke it cleane against reason, but let such describe some portion of the world in it, they may compare it with a Globe, and see it beare a true semetry, but in their plaine Card it will appeare monstrous. Here is now a view of the world from Centor to Circumference, Here is an entrance to the meanes of obtaining to some abilitie in the vse and practise thereof: But aboue all and in all things giue vnto the Lord the glorie due vnto his name, *Pf. 29. 2.* And this indeed is the verie thing wherein we ought to reioyce, and for which God made vs, namely, to seeke his glorie, which is wonderfully seene and set forth in the frame of the World, but most mightily in the part vnseene but by Faith, with which eye thou must looke into Heauen by viewing here on Earth Gods holy Word, and hearkening with the care of Faith, to the Ministers of his Word, who doe breake the Bread of Life vnto the faithfull, and are able to giue strong meat vnto men, & milke vnto babes, so shalt thou be the better able to worship the Lord in the beautie of his holinesse, *Pf. 39. 2.*

It appeareth, *Gen. 1. 14.* that God made the Lights in the Firmament to diuide the day from the night, and to be for signes and seasons, dayes and yeeres. And *v. 15.* to giue light vpon the Earth, according to the roundnesse of the Earth, and motion of the

the ☉ the light and darkenesse doe differ, for the Sunnes body being bigger then the body of the Earth, maketh that the Sunne being at the Equator, although from Sunne rising to Sunne setting be iust 12 howres, yet the light will appeare from breake of day to evening shut in 14 h. 24 m. and the darkenesse will continue 9 h. 36 m. Now if two men be one vnder the North Pole, another vnder the South Pole, they shall both see the Sunne in their Horizon, if the ☉ decline towards the North, he will rise about the Horizon to him in the North, but to him in the South the ☉ setteth and when the ☉ is in the tropicke of ☉ it is noone with him in the North, but with him in the South it is midnight (*& contra.*) By this it appeareth the time betwene Sunne rising and Sunne set to either of them is about 4368 howres, or  $\frac{2}{3}$  yeere, fauing that the Lords louing kindnesse hath been of old, *Pf. 25.6* to this Christian part of the world, in placing the Suns Apoge in this part, by which we receiue a double benefit, the one of light so much the longer by the Sunnes slow motion, the other, that when the Sun is come so neere our Zeneth, it hath pleased God to draw it vp neerer Heauen and further from the Earth, that we be not burned with his heat, as it is written, The Sunne shall not burne thee by day, nor the Moone by night, *Pf. 121.6. Et contra.* in the South part of the World among the Heathen that know not God. But in the Poles the twilight lasteth so long as the Sun is within 18 deg. of the Horizon, which is about the first of May, so the darke night lasteth 1968 h. and the twilight is about 1200 h. that is 50 dayes with vs. From these two differences in a right Spheare you may make to your selfe a Theoricke of the oblique by considering the difference of light betwene any number of degrees from the Equator to the Poles as you please, or after this example: I did obserue the height of the Sunne this yeere 1627, and found him to be more then 62 deg. in Meridian height, proues that the Sun hath more then 23 deg. 30 min. declination, or else the Poles eleuation to be lesse then 51 d. 30 m. here at London, which the learned haue likewise proued in their most exact obseruations, but for the lesse learned, and the honest Sea-mans vse, the declination of 23 d. 30 m. will make no error. Note that in a Countrey of knowne Latitude you may find by

the height of the Sun his Azimuth and declination in any Longitude, by which you may find the variation of your Compasses at all houres of the day, or by the day of the month the Suns Meridian height being giuen, is had the Latitude of the place, or height of the Pole, then the amplitude or azimuth as before, and to speake truly, these prepositions depend on one another, and what is said of the Sun, may likewise be done by the Stars being knowne, their Longitude, Latitude, and Declination being likewise had.

If any man shall say, I haue discovered my wants herein, he saith truly, if any malice my good will, let him know I care not, if any man will further my willing mind, to him I will send this Booke for Patronage, and for euer pray for him, if any scare and scoffe at mee, it were much better for his Soule that he were at prayers, and leaue scoffing. Euerie good man may if please him, amend this, and so further me. If no ignorant man will profit by it, yet let such as are honestly minded, suffer this to liue with me, because all that I haue, or can doe, is but to employ my time in such meane knowledge as I haue, to Gods glorie, and the benefit of my Countrey. Wherein if knowledge and a purse did agree with heart and good will, I would strue with the best Subject. In the meane time I will strue to doe my best, as my dutie doth bind me.

#### CHAP. VI.

##### *Of Shipping and going out of the Harbor.*

**T**Hese things afore spoken of, are most vsfull, and now I hold it a good method to examine your Ship whether shee be for your turne or not, in all things well appointed for the Sea, if new, how well built, and strong, and how well fitted in her geare, if old, whether she be able to indure the surging waues of the Sea, to goe another voyage, and likewise for her burthen, proportioned according to the businesse ye vse her for. But if ye will build a new Ship in any proportion assigned, ye shall iudge the better how to haue it done, by learning so much in Arithmetick,

ticke, as to be able to extract the Square and Rube root, then may you doe after this example next following, or otherwise at your pleasure. Let the proportion be as two to one, and suppose you haue a Ship of 100 tun, in all things so well framed, that thou doest desire to haue one of 200 tun, and like to the other, to do this, first take the measures of your first Ship, which suppose to be these, the Keele 44 foot, at the Beame 20 foot, in Houle 9 foot, her Rake afore 13 foot, after 7 foot, here is giuen sixe numbers, and the proportion assigned, and seeing the proportion is to be doubled, therefore take ech number & cube it, then double that cube number, and extract the cube root of that number, and you shall find the second Ship must haue in Keele  $55\frac{1}{2}$  foot neere, and Beame 25 and about  $\frac{1}{2}$ , in Houle  $11\frac{1}{2}$ , Rake afore  $16\frac{1}{2}$ , after almost 9, and her burthen will be 200 tun, or this may be found by that excellent Instrument of the memorable Malt. *Edmund Gunter*, lately set forth by him in his life-time, and is called a Sector, his proportionall Ruler and Crosse-staffe is well knowne to bee an excellent Instrument for these purposes following, and also for many other, Take in equall parts of the Sector 44, and fit it ouer in the Cubes at 44, the Sector so resting, take with your Compasses the distance ouer in 88 of the Cubes, and apply it to the equall parts, giueth  $55\frac{1}{2}$ , as before, do so by the rest, and you shall find the like numbers.

But say it be demanded to haue her of any other proportion, namely, as 20 to 15, or 4 to 3, take the measures of the first, as before, and cube them, then say, if 15 giue such a Cube, what Cube shall 20 giue, it will giue a number, whose Cube root is the number sought. But by the Sector take the numbers giuen, &c. in equall parts, and fit them ouer in 15 of the Cubes, then take the distance ouer in 20 of the same lines, and that applied to the equall parts, giueth the number sought.

And now being fitted with a Ship for thy purpose, and hauing launched, and going downe the Riuer take heed to the set of the Tyde, not onely for running fowle of other craft, but least ye bring your selfe on ground on a Lee shore, on a Shelfe, Sand, or Shole, as Barking shelve, a Shole against Grayes, Blacke shelve, the Piles below Tilberie, Milton shore, or in a darke night gape  
for

for a shore, and thinke to gaine the point, but run your Ship cleane out of the Thames, as I see one had done, the 18 Decemb. 1627, and layd her on the March below Greene-hiue in Kent. Going out or in any Riuer whatsoeuer, note what markes you see with the opening of any Point, as Yoke on a Wall, Tree, House, Hill, Wood, Wind-mill, Steeple, Castle, or Towne, and learne to describe the Semetry of it, and note it in a Booke, remembring to found the depth, and note it likewise, and what grounds for ancing good or bad, with the swiftnesse and indraft or outlet of the waters, ye may also describe the windings thereof by the Compasse, with the lenghts and breadths on a Paper, and be sure to note the magniticall Azimuth, for your variations, be it of the Sunne or Starres, which to be able to do, learne so much in Geometry, as to be able to describe the Spheare in plaine, and to know the vse of the Globes, or at least to vse your plaine Scale, and keep your traunce on your Card, & a Journall or daies Book, and know both in Riuer and at Sea, thou must make vse of these two Globes, namely, the Scriptures where the good shine like Starres, and Christ Iesus is the true Load-stone.

## CAHP. VII.

*Of the Journall, obseruation, and profection.*

**W**hen you are come into the Sea, begin your Journall on this wise: In the Name of God, Amen. The daies Booke for the Voyage intended, for Saint Christophers, and Castle de Mine. The 24 of May wee came out of Portsmouth, and anchored in Stokes Bay. The 25 wee weighed, and with a gale Easterly. The 26 we put thorough the Needles. The 27 wee put in at Dartmouth, the wind South South West, verie foggy. And you may make a Kalender after such like order as this.

Month.



heare though I haue set but some dayes of the month: yet I meane you should set downe each day, and in the last space to note each dayes variation, and which Pole is eliated in the end, say: This 31. of Iuly, sayling on an east winde by Gods protection, we had sight of *Matalena*, and at noone our latitude found by the Sunne pearing thorow the Vane of your Instrumēt 15. *de.* 3. *mi.* and by the North Starre the next morning the like: so at noone the South East part of *Matalena* South, and the Meridian distance from the Lizard 1009 leagues, and difference of longitude 57. *de.* and dominico South end 58. *de.* and in your way note thus, for example in a booke by it selfe: May the 24. from the 23. at noone, from south to East 10. *de.* 17. *mi.* latitude 23. *de.* 18. *mi.* ☉ magnitude, Azimuth 130. *de.* 5. *mi.* True Azimuth 117. *de.* 12. *mi.* the variation 12. *de.* 53. *mi.* as in chap. 4. and set downe whatsoever is remarkable in your way, as well in the Sea as else for example being in the Latitude of 46. S. the body of the Iles of *Babe* North East, 7 leagues being to the North of the Maine shole that lyeth in my way betweene *Mintain* and Iles *Babe* the West Land of *Babe* Iles North West 1. North 5. leagues from the South Ile of *Babe* towards the East by North. 20. leagues in Latitude 20. is a dry shole that hath to the W. N. W. of it a shole or Ledge that is 3. leagues off. Also from the dry shole is on to the N. E. and from the dry shole another to the E. S. E. from the dry shole the pike of *Pasmond* Hill 31. *de.* Mag. E. to N. 42. miles, which I found by obseruation: for being 6. miles from shole, my Angle of shole and Hill 85. *de.* and the Angle from shole to hill and Ship 87. *de.* from Hill to Shole and Ship 8. *de.* by which the distance was found, and the Hill appeared thus.

And for the soundings doe thus, Aprill 29. euening *Bantum* hill 17. *de.* 2. *mi.* from S. to W. 14. fatham *Poloubain* and neare point 26. from S. to W. 14. fatham, at the same time A. N.E. by E. 3. leagues. 4. fatham.

And now left any should say I haue prescribed many things to others, and can doe nothing my selfe; I will make an euident and plaine demonstration of most of these things, wherein I shall make more easie the booke of *M. Thomas Addison*, sometime of *Ratcliffe*, in his life time a good Sea-man, and Mr. of the Ship called the

*Palsgrawe*, bound to the East-Indies in the yeere 1624. where he dyed before he had diuulged them: his widdow not knowing what to doe in the matter, and I hearing of the same, did purchase the said bookes at my owne charge: Thinking it but my duty to quicken and raise vnto life for the benefit of my Country-men, according to the minde and intent of the Author, that which would haue dyed, or at least was like to haue dyed in the shell.

First, therefore as I haue spoken of the circles of the matterall Spheare and Globe, so I would haue you vnderstand them, though they be described in plano after this manner. It is description is common: but I haue described the parallell lines with prickles, the horizon and circle of depression with blacke, the almacanter with the other parallells are red, the figments within are to shew the houre lines as that which croseth the equator as it were at rect Angles: that which croseth the horizon like wise to shew the Azimuth and that which croseth the Ecliptike to shew the Longitude and Latitude in the Heauens, and though thers 3. inscribed figments be something hard to doe by Geometricall demonstration, and for so much as they are of singular vse: Therefore when thou wilt finde the true Azimuth, Longitude, or houre on a parallell; Take thy Sector (see chap. 6.) and open it to the distance of the Semidiameter of that parallell in the totall Sine, then take the distance in the Sine giuen and apply it in the parallell from the centor it sheweth the true place.

Now I haue giuen a rule before for finding the Sunnes place in the Zodiack, see chap. 4. which we will for examples sake suppose to be the 30. day Aprill 1629. which is by the Tables of Origanus 19 *de*. 21. *m*. 2. *se*. of 8. and by my rule iust 19 *de*. the point in this demonstration for that place is at B. and this point is found by the circle deuided as is before spoken of, chap. 4. by taking fromward the poles of the Zodiack, the Sunnes Longitude in degrees, which in this example is 49. *de*. hauing the day of the month, and the ☉. place found, the rest followeth most easily: For a parallell drawne to the equator thorow the point at B. sheweth the declination at C. from A. right Ascencion B. C. Amplitude A. D. Meridian height F. H. the difference Ascencionall C. D. and all the rest followeth, and are measured by degrees on the limbe. By the same I may say if

if the declination be giuen, as from A. in the Centor, to C. the ☉. parralell, which by Origanus for the 30. day of Aprill 1629. is 17. *de.* 46. *mi.* and by this it is 17. *de.* 30. which is but little lesse; and that was by the neglect of the minuts in the Sunnes Longitude.

I will giue one demonstration more, and that shall suffice for this paper, for my purpose is to include all this worke within these few sheets.

This projection is of that chapter the 4. May the 4. 1629. ☉. place the 22. *d.* 12. *m.* 41. *se.* ☉. Origanus Tables, declination 18. *d.* 32. *mi.* N. ☉. Longt. 53. *de.* 12. *m.* 41. *se.* but by this projection, Suns place 23. *de.* and A. C. declination 18. *de.* 30. *mi.* Longitude 53. *de.* and at B. from A. A. D. the Amplitude 28. *de.* E. F. the Meridian height 55. *de.* B. C. right Ascension 50. *de.* C. D. difference Ascensionall 23. *de.* 0. *mi.* B. G. Oblique Ascension 27. *de.* 0. *mi.* D. E. semydiurnall arke 7. *ho.* 32. *mi.* D. E. semynocturnall arke 4. *ho.* 28. D. H. length of twilight 2. *ho.* 4. *mi.* H. E. time from noone to euening shut is 9. *ho.* 33. *mi.* that double is the length of the day. 19. *ho.* 6. *mi.* This last taken from 24. leaueth the length of the night darke 4. *ho.* 54. *mi.* Sun riseth at D. 4. *ho.* 28. *mi.* seteth at 7. *ho.* 32. *mi.* Time from rising to setting 15. *ho.* 4. from Sun setting, to his rising 8. *ho.* 56. *mi.* Height of the Pole N. R. 51. *de.* 30. *mi.* Though many more propolitions may be wrought by this kinde of projection, yet to make some good vse of this marke, the last which is the height of the Pole found, so that if ye doe but remember the day of the month, which you must needs doe by your Kalender in the beginning of this chap. or his declination: take his amplitude Azimuth, or Meridionall height, hauing with you your Compasses: Compasse, crostasse, Sea-quadrant, Card, and some good Tables of the fixed Starres, that yee may vse them for obseruation in the night: and by all meanes I would haue you get the reckoning of your Ships way by that excellent way of Mr. Addisons of the  $\frac{1}{2}$ . minut glasse, the Log-line, and also by what true way foucer the experienced Sea-man can bring to light; and then may you cast vp your Trauerse by that excellent way of the Arithmetical Navigation, by your Card and Trauerse bord, and by this Kalender, whose vse is this; Iune the 23. being in Latitude 48. *de.* 14. found by obseruation, we sailed vntill the 24. noone that is

24. *ho.* there is the month, day, houre, in the 2 first columes vpon a course of 33. *de.* from S. to W. 20. leagues, the winde being N. N. E. all this is in the 3. next columes : the Latitude then obserued to be 47. *de.* 25. *mi.* Longitude in miles 88. from Lizard west and the variation 12. *de.* 53. *mi.* depth 90. fatham, (if it were found so) and these in the 2. last columes, and from Iuly the 19 in Latitude 17. *de.* 40. *mi.* to Iuly the 21. no one, that is 48. *ho.* we sayled on a course of 18. *de.* from W. to S. 74. leagues. The winde being at E. N. E. which brought vs into the Latitude of 16. *de.* 35. *mi.* and into Longitude 1834. miles : or 611  $\frac{1}{2}$ . leagues W. from Lizard vad 10. *de.* 0. *mi.* Depths 60. fatham, S. W. 7. leagues a Rock, & S. by W. land thus. Note that if you get your height and course exactly, it will correct your way, height and way will correct your course : course and way will correct your height : but strue to doe all as exact as possible you can, to doe which, note what followeth.

*Propositions of Navigation, Arithmetically,  
Geometrically, and Instrumentally shewed.*

Chap. 8.

1. *To finde the leagues run on any course, the difference of  
Latitude and course being given.*

1 **A**S the sine of the course from the parrallel is to the miles in difference of Latitude : so is the totall sine to the leagues run.

2 As the Tangent of the course, from the parrallel is to the miles in a degree of Latitude ; so is the Secant of the course to the way.

3 As the totall sine is to the miles in the difference of Latitude; so is the Secant of the course, from the Meridian to the miles run.

4 As the sine of the course from the Meridian is to the miles in difference of Latitude ; so is the Tangent of the course from Meridian to the way.

5 Let the Logarithme of the course from the parrallel be taken out of the Logarithme of miles in difference of Latitude, the remainder is the Logarithme of the miles in way.

6 Instrumentally by the Sector, take in the equall parts the miles  
in

in difference of Latitude and fit it over in the equall fines of the course from the parallell, the Sector so opened, take the distance over in the totall signe and that distance applyed to the equall parts giueth the miles of way run.

2 *The difference of Latitude and Longitude giuen to finde the leagues run.*

**S**quare both sides, then ad the 2. squares together and extract the square roote is the miles in way run.

Looke which is the greater side, either the Lat. or the Lon. and take his Log. out of the Log. of the lesser side, the remainder giueth the two acute Angles, then let the Log. of either of them be taken out of the Log of the side opposit: the remainder is the Log. of way I shew not how it giueth the Angles but leaue thee to inquire.

Open the Sector to a rectangl: then take the miles in Longitude and set it on one side, the Sector from the Centor in equall parts, and the miles in Latitude on the other side: then take the distance over with a paire of Compaffes, and apply that distance to the equall parts, giueth the number of miles in way.

3 *To finde the difference of Longitude, the course and difference of Latitude being giuen.*

**A**s the sine of the course from the parallell is to the difference in Latitude, so is the sine of the course from the Meridian to the difference in Longitude.

As the totall sine is to the difference in Latitude: so is the Tangent of the course from the Meridean to the Longitude.

As the Tangent of the course, from the parallell to the miles in Latitude: so is the totall sine to the miles in Longitude.

As the Secant of the course from the parallell is to the difference of Latitude: so is the Secant of the course from the Meridian to the Longitude sought.

Take the Logarithme difference of the Angle from the Meridian out of the Logarithme of the difference of Latitude in miles the remainder is the logarithme of Longitude in miles.

Take the number of equall parts (in the Sector) which are the difference of Latitude, & fit that distance over in the lines of fines

of course from the parralell, and the instrument opened to that wid-  
ness: the distance over in the sine of the course from the Meridi-  
an: that distance applied to the equall parts, sheweth the Longi-  
tude in miles.

4 *To finde how many miles off the equator or Me-  
ridian is a degree of Longitude in any parralell of  
Latitude.*

1 **A**S the totall sine is to the miles in a degree of the equator: so  
is the sine of the complement of Latitude to the miles sought.

2 As the Tangent of the Latitude is to a degree in the Meridian:  
so is the sine of the Latitude to the miles sought.

3 As the Secant of the Latitude is to the miles in the equator or  
Meridian: so is the totall sine to the miles sought

4 As the Secant of the complement of Latitude is to the miles of  
Meridian: so is the Tangent of the complement of Latitude to the  
miles, answering a degree.

5 Let the logarithme of the complement of Latitude be added to  
the logarithme of miles in a meridians degree; the totall is the lo-  
garithme of miles sought.

6 Instrumentally, take the number of equall parts in a degree of  
the Meridian or equator by the Sector; & fit them over in the sines  
totall: then take the distance over in the sines of the complement  
of Latitude, and apply that to the equall parts, sheweth the miles  
that make a degree of Longitude in that parralell.

5 *To finde the Longitude answering to a Meri-  
dian distance in any parralell of Latitude.*

1 **A**S the sine of the complement of Latitude is to the Meridian  
distance: so is the totall sine to the Longitude.

2 As the sine of the Latitude is to the Meridian distance: so is the  
Tangent of the Latitude to the Longitude.

3 As the totall sine to the Meridian distance: so is the Secant of  
Latitude to the Longitude.

As



As the Tangent of the complement to the Meridian distance : so  
is the Secant of the complement to the Longitude. 4

Let the Logarithme of the complement be taken out of the Lo-  
garithme of Meridian distance, the remainder is Logarithme of  
Longitude. 5

Take from the scale of equall parts in the Sector the Meridian  
distance ; and fit with your Compasses in the sines of the Latitudes  
complement ; then the distance taken between 90. and 90. apply-  
ed to the same scale, giueeth the Longitude. 6

*6 To finde the signe of any Arke in any parrallell.*

**A**s the totall sine is to the complement : so is the sine giuen  
in the great Circle to the sine in the Latitude.

As the Tangent of Latitude to the sine of Latitude : so is the  
sine of the Arke in the great Diameter to the sine of the Arke in  
the lesser.

As the Secant of Latitude to the totall sine : so is the sine in the  
greater, to the sine in the lesser Semydiameter. 3

As the Secant of the complement is to the Tangent thereof : so is  
the sine in the greater to the sine in the lesser. 4

Ad to the Logarithme of the Arke giuen, the Logarithme of  
the complement of Latitude, the totall is the Logarithme of sine  
demanded. *This redu-  
ceth Lon-  
gitud miles  
into degr:* 5

By the Sector let the distance from the Centor to the Arke giuen  
be put over in 90. and 90. then the distance between the sines of  
the complement of Latitude, applied from the Centor, giueeth the  
Arke whose sine is the demanded. 6

*7 By a sine giuen in a parrallell, to finde the Arke.*

**A**s the sine of the complement of the Latitude is to the sine  
giuen : so is the totall sine to the sine of the Arke. 1

As the sine of the parrallell is to the sine giuen : so is the Tangent  
of the parrallell to the sine of the Arke sought. 2

As the totall sine is to the sine giuen ; so is the Secant of parral-  
lell to the sine of the Arke sought. 3

As the Tangent of the complement is to the sine giuen : so is the  
Tangent thereof to the sine of the Arke sought. 4

Out

5 Out of the *Logarithme* of the sine given, take the *Logarithme*  
of the complement of *Latit*: the rest is the *Logarithme* of the sine.  
6 By Instrument let the distance of the signe given be taken from  
It reduceth Meridian degrees in to Longi- tude.  
the Centor and fitted in the sine of the complement of *Latitude*;  
then the distance betweene 90. and 90. being set from the Centor  
sheweth the Arke.

8 *To finde how many miles on Earth or Sea serueth  
to a minute of time in the Heauen, in any parrall  
of Latitude.*

1 AS the totall sine is to 15. mile, which serueth a minute of time  
vnder the equator: so is the sine of the complement of *Latit*-  
tude to the number sought.

2 As the *Tangent* of the *Latitude* is to the miles in the equator: so  
is the sine of the *Latitude* to the miles sought.

3 As the *Secant* of the *Latitude* is to the miles in a minute at the  
equator: so is the totall sine to the miles in a minute of that *parr*-  
allell.

4 As the *Secant* of the complement of *Latitude*, is to the miles in  
the equator: so is the *Tangent* thereof to the miles in a minute of  
that *parrallell*.

5 Add the *Logarithme* of the 15. miles, to the *Logarithme* of  
the complement of *Latitude*, the summe is the *Logarithme* of the  
miles in that *parrallell*.

6 By the Instrument or Sector, take 15. the miles that seru e in  
the equator to a minute of time out of the equall parts, and fit it  
ouer in the totall sines: then the distance ouer in the sine of the  
complement of *Latitude* applied to the equall parts, sheweth the  
miles to a minute in that *parrallell*.

This chapter hath shewed how to finde the leagues run on any  
course, or the Ships way, and to finde the difference of *Longitude*,  
with things thereto pertaining, the next sheweth.

#### *Chapter the 9.*

9 *To finde the course the way and difference of Latitude given.*

1 AS the miles in way (or run) is to the totall sine: so is the miles  
in difference of *Latitude* to the course (or run) his sine from  
parrallell

As the miles in difference of latit.to the totall sine, so the miles in way to the seca.of course from meridian. 2

As the difference of latitude to the way, so the totall sine to the secant of course from meridian. 3.

Square both difference of latitude and way, then subtract the lesser out of the greater, out of the remainder, extract the square roote, then as that roote to the totall sine, so the difference of latitude to tangent of course from paralell. This gives the longitude, 4

Let the logarithme of way be taken out of the logarithme of difference of latitude, the remainder is logarithme of course from paralell. 5

Take the equall parts in way, and fit over in the totall sine, then take the difference of latitude, and fit over in equall sines, gives the course from paralell. 6.

10. *To find the course, the way, and longitude given.*

As the way to the totall sine, so the longitude to course from the meridian. 1

As the longitude to the totall sine, so the way to the secant of course from paralell. 2

As the longitude to the way, so the totall sine to the secant of course from paralell. 3

Square both longitude and way, then subtract the lesser out of the greater, out of the remainder extract the square roote, then as that roote to the totall sine, so the longitude to the tangent of course from the meridian. This gives the latitude, 4.

Let the logarithme of way be taken out of the logarithme of difference of longitude, the remainder is logarithme of course from the meridian. 5

Let the equall parts in way be fitted over in the totall sine, then the long. fitted over in equall sines, gives the course from the meridian. 6

11. *To find the course, the longitude and latitude given.*

As the  $\frac{1}{2}$  of the 2 sides added, is to the difference of each side, so the tangent of  $\frac{1}{2}$  the 2 unknowne angles, to the tangent of an arke, which being added to, or taken from  $\frac{1}{2}$  the 2 unknowne angles, gives the course. 1

Take the logarithme of the greater side, out of the logarithme of the lesser side, the remainder is logarithme of the tangent of the course. 2

rithme of the lesser, the remainder is logarithme of the angle opposite to the lesser side.

Open the sector to a rectangle, and take the longitude and latitude, and fit them on 2 sides from the center; and from those 2 extensions take the distance with a paire of compasses, and fit it over in the totall sine; Then take the longitude, and fit over in equall sines, gives the course from the meridian, but the latitude so fitted gives the course from paralell.

12. *To find the latitude, the course and way given.*

1 **A**S the totall sine to the way, so the sine of course from paralell to the latitude sought.

2 As the secant of course from paralell to the way, so the tangent of the same to the difference of latitude.

3 As the secant of course from the meridian, to the way, so the totall sine to the difference of latitude.

4. As the tangent of course from the meridian, to the way, so the sine of the same course to the difference of latitude.

5 Adde the logarithme of way to the logarithme of course from paralell, the totall is the logarithme of difference of latitude.

6. Take the miles in way, and fit over in the totall sine, then the distance over in the sine of course from paralell, gives the miles in difference of latitude.

I have shewed already, chap. 7. how the distance from Passamont hill was found; And as I conceiue, it is easie to finde the distance of places, if you doe but know the vse of my Table of sines, tangents and secants, proviso, note that the 3 angles of any right-lined triangle is equal to 2 rectangles or 180 degrees.

For commonly at sea, you must obserue the land, shore, or whatsoever it is you would know the distance from, what angle it maketh with your course; as admit 40 degrees, then reckon your ships way, suppose 1000 fathome, and then observe againe, let your second angle be 100 degrees, then adde 100 deg: & 40 degr: which subtract from 180 degr: remainder 40 degr: for the third angle; then haue you 3 angles and one side given, by which means the other 2 sides are easily had, and consequently the distance.

Now

Now if the young beginner be troubled to finde the sine of an angle, so big as 100 degr: let him note what the Table saith; subtract 90 degr: from 100 degr: the remainder 10 degr: subtract from 90 degr: rests 80 degr: or subtract 100 degr: from 180 degr: rests 80 degr: whose sine in my table is 985; the other two angles being 40 degr: and 40 degr: their sines are 643 and 643, and the distance 1000 fathome: Now to fetch the distance from shore say, as 643 the sine of 40 degr: at *c*, found as before, to 1000 fathome, the distance from *a* to *b*, the 2 places of observation, so 984 the sine of 80 degr: in the lesser quadrant, or 100 degr: in the great, (which is all one) to the distance from *a* to *c* 1531  $\frac{567}{617}$  fathome. Another example. 996 sine of 84 degr: 50. 985 sine of 80 de. 262 sine of 15 d: 10. Let your first observation be at *b* 80 degr: the second at *d* 84 degr: 50, and by your reckoning the distance 254 fathome; now it is easy by the former rule to find the angle at *c* 15 degr: 10: then say if 262 giue 254, what giues 985, facit *c d* 954  $\frac{120}{131}$ . And as 262 to 254, so 996 to the distance *b c*. So that it is all one whether the angles be right, or obtuse, or acute, if they be all acute, there is no more to doe but take the sines out of my table as in the figure K, and no more, if one be a rectangle, then the other 2 are acute, but if an angle be obtuse, as in the figure L, the angle at *b* 100 degr: doe by that angle whatsoever it be, as in the first example; here because the angles at *a* and *c* are equal, therefore the distance from *b* to *c* is 1000 fathome.

But by the second example, it is but 965  $\frac{77}{131}$ , therefore the angle at *d* was not truly taken; for what 965  $\frac{77}{131}$  is in proportion to 1000, so is the angle at *d* to the true angle: which must needs be more then 84 degr: 50, and the angle at *c* lesse then 15 degr: 10 and consequently the side *c d* is more then 954  $\frac{120}{131}$ . And further you may note, if you have observed so well that the angles be truly taken, then have you not reckoned your ships way truly; and so you may see that one of these doth correct the other, as in the end of the 7 chapter.

And you may fetch a distance by Geometricall protraction, as in chap. 4. suppose you would know the distance from *c*

and  $b$  to  $f$ , in the figure  $m$ , first having drawne the angle  $b e f$ , then reckon your ships way from  $e$  to  $b$  200 fathome, and having laid downe so much by your scale and compasses, (see pag. 12) you shall observe to lay the line  $e b$  right in the course your ship went, with  $b$  next your eye, and  $e$  towards the place of your first observation; then from  $b$  draw another line to  $f$ , and that line will intersect with the line  $e f$  at  $f$ , and then you may measure the distance; as in this example  $b f$  is 100 fathom, and  $e f$  is 140 fathom.

The next thing that will trouble the young beginner, is the propositions in these 8 and 9 chapters, which are most easily performed, because the demonstration is so plaine.

First therefore as in all plain triangles, the sides are in proportion one to another, as the subtences of the angles opposite, or as the sines of the angles opposite to those sides. Example in the inscribed triangle:  $\triangle a b c$  the angle at  $b$  is in proportion to the side  $c d$  or arke  $c g d$ , as the angle  $c$  to the side  $b d$ , or arke  $b d e$ , and so is the angle  $d$  to the side  $b c$ , or arke  $b f c$ .

So note that in all rectangled right-lined triangles, the two containing sides of the rectangle stand perpendicular one upon the end of another: Therefore if you put the least side for radius or totall sine, as in the figure  $b$ , the other side will be the tangent, and the subtending side of the rectangle will be the secant; or if you put the greater side for radius, the least will be the tangent, and the subtence the secant, or you may put the subtence for radius, as in the figure  $c$  is done.

It is manifest then that any side may be put for the totall sine: First, if you put the subtending side for radius, as in the figure  $d$ , let  $a b$  be part of a meridian, and  $a c$  part of a paralll; then is the angle at  $b$  the course from the meridian, and the angle at  $c$  is the course from paralll.

Then if the difference of latitude  $a b$ , and course, that is the angle at  $b$  or  $c$  be given, you may finde the leagues runne, or distance  $b c$ , as in the first resolution Arithmetically.

Or if you put the longer side  $a b$  for radius, then say as the totall sine  $a b$  to the difference of latitude  $a b$ , so the secant  $b c$  of course,  $b$  from the meridian, to the distance  $b c$ ; if you put the



the least side for radius, say as the tangent  $ab$  of course  $c$  from parallell, to  $ab$  the difference of latitude, so  $bc$  the secant of the same course, to  $bc$  the distance. Let this suffice for the first proposition chap. 8.

But if you demand the difference of longitude, the latitude and course being given, you may doe it by the first or second example Arithmetically in this chapter. page 29; or if you put the longer side  $bc$  for radius, say, as the course  $c$  to  $ab$ , so the course  $b$  to  $ac$  the longitude: but if you put the side  $ab$  for radius, say, as the totall sine to the difference of latitude, so the tangent  $ac$  to the difference of longitude: if the least side be put for radius, say, as the tangent  $ab$  to the difference of latitude, so the totall sine to the difference of longitude. And this sufficeth for the Geometricall demonstration of the third proposition, chap. 8.

And now you see how the proportionall numbers doe arise, it is easie to take them out of the Table, and worke them Arithmetically; and what is said of these propositions may be said of all the rest by the very same reason; except the second proposition chap. 8, and the 11 proposition in this chapter page 27: the first of these is done as in *Euclid* 1.47, or thus Arithmetically.

Let the line  $a$  be 3 leagues of longitude, and the line  $b$  4 leagues of latitude, first multiply 3 into 3, it is 9, and 4 into 4 is 16, which added is 25, the square roote is 5, for 5 times 5 is 25, and this is equall to the line  $c$ , the shippes way.

The Geometricall demonstration is this, set the line  $a$  perpendicular vpon the line  $b$ , as in the figure  $f$ , then draw the line  $c$ , and it is 5 the shippes way.

There is another way of demonstration, by adding the sides of the squares into one; also if the way and longitude had beene given, to subtract the one out of the other Geometrically, the remainder is the difference of latitude: if the way and latitude had beene given, then the side of the remainder is the difference of longitude, *Euclid* 1.47. theor. 33. 6.31. theor.

21.

The next should be of the 11 proposition, but I suppose he  
E 3 that

that understands that is more than an ignorant man, therefore whoſoever will learne that, with the extraction of the ſquare and cube roote, or any thing elſe that is in my booke, or any of thoſe things that I have ſet out in any of my bills; let them come to my dwelling, and I will ſatiffie their demand ſo farre forth as God ſhall inable mee: where youth may bee taught, dieted and lodged for reaſonable conſideration.

## CHAP. X.

### *Of the motion of the Moone, and comming into the Harbour.*

**I** Might here have added many and manifold propoſitions, and chiefly thoſe which doe concerne the great circle diſtance betweene any two places howſoever ſcitu-ate; but I will firſt ſee thy kinde acceptance of this: which if you receive thankfully, I ſhall be ready to ſhew thee many more to thy great ſatiffaction, with the Geometricall demonſtration, which I have gathered into a booke in Folio.

And now I will finiſh this worke with the Moones motion; ſuppoſing you are come in ſight of your wiſhed port in ſafety: which I doe heartily wiſh to all honeſt Seamen of my Country, that travell the ſeas to good ends.

And admit you are in a ſtrange coaſt, you may the better come to finde the time of a full ſea, at a ſpring tide, to bring your good ſhippe over a barre or ſhole: ſo I ſhall end my worke where Mr. *Addiſon* began his: then having read this, you may reade his which is hereto joyned; giving you to underſtand, if you learne well theſe propoſitions of mine, they will make even the hardeſt things in his booke eaſy for thy underſtanding.

Let

Let the full sea at your place of being be at a S Moone on the day of conjunction as at *a*, and the Sunne going in 4 degrees, as from *a* to *c*, the Moone removing in the meane time 48 degrees from the Sunne, as to *d*, doth make 3 houres 12 minutes after noone for the time of high water; and in 16 dayes more the Sunne going from *c* to *e*, that is 20 degrees from *a*: in the meane time the Moone going from *d* to *f*, that is 260 degrees from *a*, which maketh 17 houres 20 minutes, then subtract 12 houres 0 minutes from 17 houres 20 minutes, the remainder 5 houres 20 minutes; out of which take 1 houre 20 minutes for the time of the Sunnes motion in 20 dayes, remainder 4 a clocke for the true time of full sea the Moone being 20 dayes olde; if you perceive not the reason hereof inquire futher, and so you may examine the truth hereof.

Therefore to the ignorant and honest Seaman I say, joyne these things in practise with those things thy Master doth teach thee at sea: And to those things you learne at sea by experience joyne the practise of the things taught in this booke, and you shall be able in short time, through Gods grace, no doubt, to take charge thy selfe to thy great commendations.

To conclude, you may doe most of the things taught in this booke as afore spoken of chapter the 4, with ruler and compasses; which if you practise and make your selfe able to performe, (wishing to every good man that is willing to follow these rules, that I were at his elbow to make him a more plaine demonstration) he shall be able in a short time, to doe such service, which without these will not be performed in ten times so much time.

And so I pray thee to accept of this my labour, for unto such as are ignorant and honest, that would learne, onely doe I write this booke: And be sure to reade it all before you judge, so shall you see that such a thing there is, then reade it over againe, and you shall see what manner of thing it is, so you may judge of the good will of the Authour, and reade it over the third time to thy singular profit.

As

As in *Ecclesiasticus* chapter the 22, verse 23, it is said of a neighbour, so I say to thee of thy friend to Navigation;

*Be faithfull to him in his poverty, that you may rejoyce with him in his prosperity, abide stedfast with him in the time of his trouble, that you may be heire with him in (this his little book) his heritage: for a meane estate is not alwayes to be contemned, nor the rich that is foolish to be had in admiration.*

Now I beseech Almighty God of his mercy in Christ Iesus, that wee may so profit in Christs schoole, that we may bee able thereby to passe the waves of this sea of glasse, that we may all arrive at the haven of eternall happinesse.

*Amen.*

F I N I S.





# A Table of Sines, Tangents, and Secants Radius, 1000. for ease, in working (Degrees of) the Propositions in my Booke. (the Quadrant.)

Each 10. minuts of every degree of the same Quadrant.

mi.	0	1	2	3	4	5	6	7	mi.	8	9	10	11	12	13	14	15	mi.	16	17	18	19	20	21	22	23
0	0	17	35	52	70	87	105	122	0	139	156	174	192	208	225	242	259	0	276	292	309	326	342	358	375	391
10	0	17	35	52	70	87	105	122	10	141	158	175	192	211	231	249	268	10	287	306	325	344	364	384	404	424
20	1000	1000	1001	1001	1002	1004	1006	1008	20	1010	1012	1015	1017	1021	1026	1031	1035	20	1040	1046	1051	1058	1064	1071	1079	1086
30	3	20	38	55	73	90	107	125	30	142	159	177	194	211	228	245	262	30	278	295	312	328	345	361	377	393
40	3	20	38	55	73	90	108	126	40	144	161	179	197	215	234	252	271	40	290	309	328	348	367	387	407	427
50	1000	1000	1001	1002	1003	1004	1006	1008	50	1010	1013	1016	1019	1023	1027	1031	1036	50	1041	1047	1052	1059	1065	1072	1080	1088
60	6	23	41	58	76	93	110	128	60	145	162	179	197	215	233	250	267	60	281	298	315	331	347	364	380	396
70	6	23	41	58	76	93	111	129	70	146	164	182	200	218	237	256	274	70	293	312	331	351	371	391	411	431
80	1000	1000	1001	1002	1003	1004	1006	1008	80	1011	1013	1017	1020	1024	1028	1032	1037	80	1042	1048	1053	1060	1066	1074	1081	1089
90	9	26	44	61	78	96	113	131	90	148	165	182	199	216	233	250	267	90	284	301	317	334	350	367	383	399
100	9	26	44	61	78	96	114	132	100	149	167	185	202	220	237	255	272	100	296	315	335	354	374	394	414	435
110	1000	1000	1001	1002	1003	1005	1006	1009	110	1011	1014	1017	1020	1024	1028	1033	1038	110	1043	1049	1054	1061	1068	1075	1082	1092
120	12	29	47	64	81	99	116	133	120	151	168	185	202	219	236	253	270	120	287	303	320	337	353	369	385	401
130	12	29	47	64	82	99	117	135	130	152	170	188	205	222	240	257	274	130	298	318	338	357	377	397	418	438
140	1000	1000	1001	1002	1003	1005	1007	1009	140	1012	1014	1018	1020	1024	1029	1034	1039	140	1044	1049	1056	1062	1069	1076	1084	1090
150	15	32	49	67	84	102	119	136	150	154	171	188	205	222	239	256	273	150	290	306	323	339	356	372	388	404
160	15	32	49	67	85	102	120	138	160	155	173	191	208	225	242	259	276	160	303	322	341	361	381	401	421	442
170	1000	1001	1001	1002	1004	1005	1007	1009	170	1012	1015	1018	1021	1024	1028	1033	1039	170	1045	1050	1057	1063	1070	1077	1085	1093
180	24	25	26	27	28	29	30	31	180	32	33	34	35	36	37	38	39	180	40	41	42	43	44	45	46	47
190	407	423	438	454	469	485	500	516	190	530	545	559	574	589	602	616	629	190	643	656	669	682	694	707	719	731
200	445	466	488	510	532	555	577	601	200	625	649	675	700	724	754	781	810	200	839	869	900	933	966	1000	1036	1072
210	1095	1103	1113	1122	1133	1143	1155	1167	210	1179	1192	1206	1221	1235	1252	1261	1287	210	1305	1325	1346	1367	1390	1414	1440	1466
220	409	425	441	457	473	487	503	518	220	532	547	562	577	591	604	618	632	220	645	658	671	684	697	709	721	733
230	449	470	491	513	535	558	581	605	230	629	654	679	703	727	758	786	815	230	844	874	906	938	971	1006	1042	1079
240	1096	1105	1114	1124	1134	1145	1157	1169	240	1181	1195	1209	1223	1237	1255	1272	1290	240	1309	1328	1349	1371	1394	1418	1444	1471
250	412	428	444	459	475	490	505	520	250	535	550	564	579	593	606	620	634	250	647	660	673	686	699	711	723	735
260	452	474	495	517	539	562	585	609	260	633	658	683	707	731	763	791	819	260	849	880	911	943	977	1012	1048	1085
270	1097	1106	1116	1126	1136	1147	1159	1171	270	1184	1197	1211	1224	1238	1258	1275	1293	270	1312	1332	1353	1375	1398	1423	1448	1476
280	415	431	446	462	477	492	508	522	280	537	552	566	581	595	609	623	636	280	649	663	676	688	701	713	725	737
290	456	477	499	521	543	566	589	613	290	637	662	687	711	735	767	795	824	290	854	885	916	949	983	1018	1054	1091
300	1099	1108	1117	1127	1138	1149	1161	1173	300	1186	1199	1213	1226	1239	1260	1278	1296	300	1315	1335	1356	1379	1402	1427	1453	1480
310	417	433	449	464	480	495	510	525	310	540	554	569	583	597	611	625	638	310	652	665	678	690	703	715	727	739
320	459	481	502	524	547	570	593	617	320	641	666	692	715	738	772	800	829	320	859	890	922	955	988	1024	1060	1098
330	1100	1109	1119	1129	1140	1151	1163	1175	330	1188	1202	1216	1229	1242	1263	1281	1299	330	1318	1339	1360	1382	1406	1431	1457	1485
340	420	436	451	467	482	497	513	527	340	542	557	571	585	599	613	627	641	340	654	667	680	692	705	717	729	741
350	463	484	506	528	551	573	597	621	350	645	670	696	720	743	777	805	834	350	864	895	927	960	994	1030	1066	1104
360	1102	1111	1121	1131	1142	1153	1165	1177	360	1190	1204	1218	1231	1244	1266	1284	1302	360	1322	1342	1364	1386	1410	1435	1462	1490
370	48	49	50	51	52	53	54	55	370	56	57	58	59	60	61	62	63	370	64	65	66	67	68	69	70	71
380	743	755	766	777	788	799	809	819	380	829	839	848	857	866	875	883	891	380	899	906	914	921	927	934	940	946
390	1111	1150	1192	1235	1280	1327	1376	1428	390	1483	1540	1600	1662	1724	1788	1851	1916	390	1981	2050	2124	2204	2287	2375	2465	2559
400	1494	1524	1556	1589	1624	1662	1701	1743	400	1788	1836	1887	1940	2000	2063	2130	2202	400	2281	2366	2459	2559	2669	2790	2924	3072
410	745	757	768	779	790	800	811	821	410	831	840	850	859	867	876	884	892	410	900	908	915	922	928	935	941	946
420	1117	1157	1199	1242	1288	1335	1385	1437	420	1492	1550	1611	1674	1740	1816	1894	1977	420	2066	2161	2264	2375	2496	2628	2773	2932
430	1500	1529	1561	1595	1630	1668	1708	1751	430	1796	1844	1896	1951	2010	2074	2142	2215	430	2295	2381	2475	2577	2689	2812	2947	3098
440	747	759	770	781	792	803	812	822	440	832	842	851	859	867	876	886	894	440	901	909	916	923	929	936	942	947
450	1124	1164	1206	1250	1295	1343	1393	1446	450	1501	1560	1621	1684	1750	1826	1907	1991	450	2081	2177	2282	2394	2517	2651	2798	2960
460	1504	1535	1567	1601	1636	1675	1715	1758	460	1804	1853	1905	1960	2020	2085	2154	2228	460	2309	2396	2491	2595	2709	2833	2971	3124
470	749	760	772	783	793	804	814	824	470	834	843	853	861	869	878	887	895	470	903	910	917	924	930	938	943	948
480	1130	1171	1213	1257	1303	1351	1402	1455	480	1511	1470	1632	1696	1764	1842	1921	2006	480	2097	2194	2300	2414	2539	2675	2824	2989
490	1509	1540	1572	1606	1642	1681	1722	1766	490	1812	1862	1914	1968	2026	2096	2166	2241	490	2323	2411	2508	2613	2729	2855	2995	3152
500	751	762	773	784	795	806	816	826	500	835	845	854	863	871	880	888	896	500	904	911	918	926	931	938	944	949
510	1137	1178	1220	1265	1311	1360	1411	1464	510	1520	1580	1643	1708	1776	1855	1935	2020	510	2112	2211	2318	2434	2560	2699	2850	3018
520	1514	1545	1578	1612	1649	1688	1729	1773	520	1821	1870															

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1771







A briefe Abstract out  
OF  
SYNTAGMA  
NAVCLERI.

Shewing,  
The III. Concords, with *Prosodia* and  
*praxis Grammatices*.

ALSO,  
To find the Difference of Longitude, or of La-  
titude; the Rumbe or Distance, by Cœlestiall obser-  
vation: All these, or any one of them alone  
(by cœlestiall observation onely)  
and so much as may bee without  
any of the rest given.

WITH  
The Demonstrations of the six *Theorems*  
at the end of the *Alphabet*.

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By J. S. M. P. and N. P.

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Printed, 1647.

TO  
**All the Servants of the ever blessed Trinity,**  
 specially those Gentlemen that beare the lofty  
 Titles of Master, Wardens, Brethren, and  
 Assistants of the *Trinity-House* :

*Over whose Doore is written these wordes,*

T R I N I T A S I N U N I T A T E.

J. S. M.


 Have brought you an Abstract of a Voyage almost finished, wherein I have been (and am now) engaged above this 61 yeares : If any under your charge desire to Travell by helpe of this Chart and directed among therest : yet let them in Gods name, abide examination (and take your allowance) of their sufficiency; for this medleth not with any thing but the Theorique, and in such manner as you see in the little library of 7 Bookes and no otherwise : for I intend no other thing, but to supply and make good, such place, as I find doth want, for any present-time of need; and untill a more sufficient helpe and supply doe come : And if none come, yet by (fortitude and the other vertues) this first Concord will shew us how to passe cleere at last : which will be a comfort in the end : This is most needfull; for, the world is a great Sea, Gods Church militant is a good Ship : our whole mortall life is the voyage; and we are unskilfull Passengers engaged therein; and our desired port is Heaven : Therefore what-ever thou art, doe not say, this little Library concernes not thee; for — Mutato nomine, de te -- narratur, saith a Poet; so I rest with the Pro-verbo, for : Little said is soone amended.

S R N-



SYNTAGMA NAUCLERI.

**F**Or the joyning of the parts in construction, it is to be understood; that seeing these 7 Bookes doe instruct every one to be more serviceable to God, and profitable to men: Therefore the whole library it selfe is the first *Syntax*, in the generall use of them altogether, in this threefold manner.

First daily, the young learner to begin with the Alphabet and rules of right Reason a Munday; On Tuesday the Primer; and a Wednesday conferre with your friend to Navigation: Let it be Thursdayes worke to learne *Syntagma Naucleri*, the better to performe the golden Art of enriching a Friday; and let Saturdayes worke be *Muse Regnantes*, the better to demean our selves in the discipline of Gods elect, a Sunday.

2. Yearely, for more maturity, learne Reason in the *Alphabet*, all the 7 weeks of the Spring, from Easter till Whitsontide, and your Arts in the *Primer* the next 7 weekes; then conferre with your Friend 7 weeks after Midsummer; so shall the fruits be ready prepared in *Syntagma Naucleri*, for the 7 weekes of Harvest; the better to get home our store for a long winter; by the *Golden art of Enriching*, about the Autumnall Equinox: so shall wee be capable of one most sweet promise of God even in this life; for, Blessed is the man, that provideth for the Poore, sick, needy, afflicted, and those that are in distresse; for the Lord will deliver him in the time of his Trouble: and study diligently, *Muse Regnantes* untill Shovetide, so shall not the winter be over-reidions; and wee shall the better persevere in the Discipline of Gods elect, all the 7 weeks of Lent, till Easter.

3. And all our life long, to augment our understanding and gaine some perfection: As from 14, our yeares of Discretion learne the Alphabet of right and sanctified Reason till 21; from 21 to 28, learne to perfect Reason with the Primer: and so take counsell of your

## Syntagma Naucleri.

Friend till 35; thence to 42, use *Syntagma Naucleri*; and the Golden Art of Intriching till 49, the first Critticall yeare of our Age: So shall our (whole) Age to 63 yeares; the great Critticall yeare of our Life (but the greatest is the 81 yeare) bee compleatly divided into all Rationall laudable learning and saving Knowledge.

The Reason I give for all this, is thus:

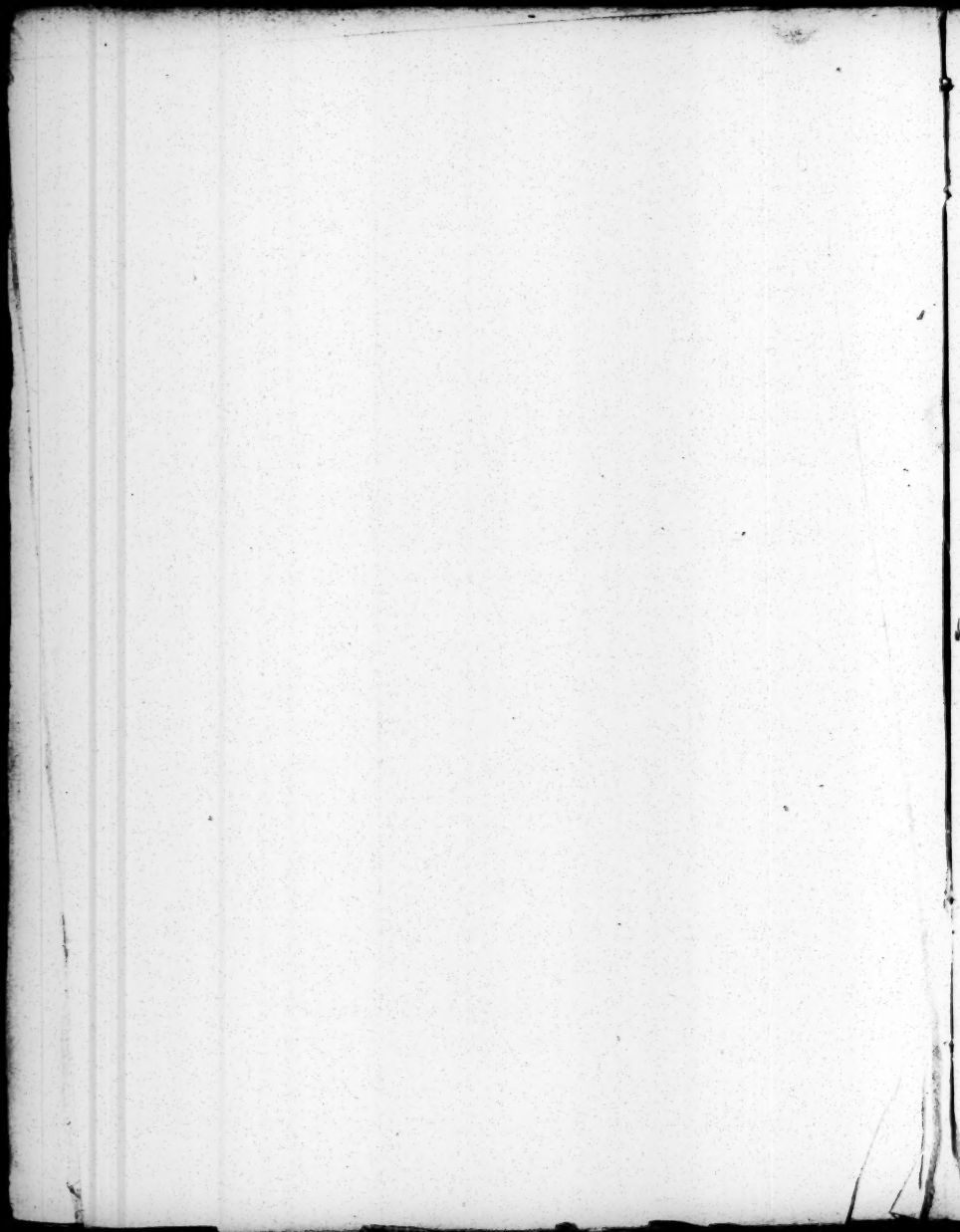
Though wee neither have Meanes, Friends, Capacity, nor Goodwill, to spend the first 14 yeares of our Age at the Grammar-Schoole; and as many at the University: That is foure yeares a Fresh-man and Sophister, and three yeares a Batchelour of Arts there; to make us sufficient Masters of the liberall Arts, Sciences, and Philosophy: and the other seaven yeares there for Exercises, Readings and Experiences: to make them more serviceable to God, and to benefit our Countrey, by the way of good literature. *Literatè*. Yet with the helpe of Gods good grace and favour, even in this simple Construction (no doubt) wee may passe through these dangerous straites, and vast Ocean sea of the World, this our transitory Life, the more blamelesse. For many get safe into an unknowne Harbour, when they can get none other Pilot but their owne Diligence, which is ever the best Pilot. Idlenesse is servant to Ignorance; but Diligence is the handmaid of knowledge and safety, whereby wee may live an honest life, and dye happie.

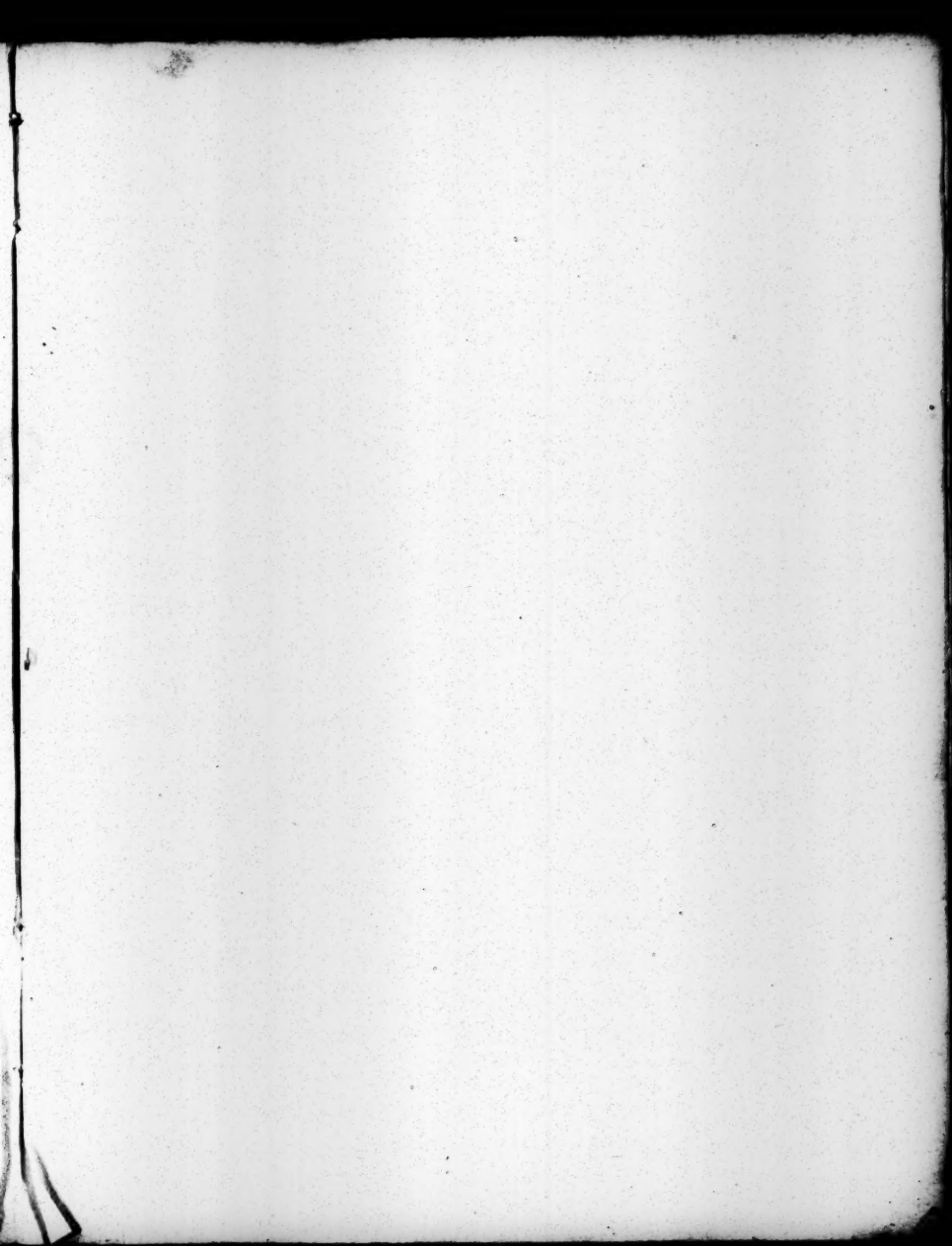
The second Concord is the Syntax and knitting together of Arithmeticall numbers with Geometrical measures.

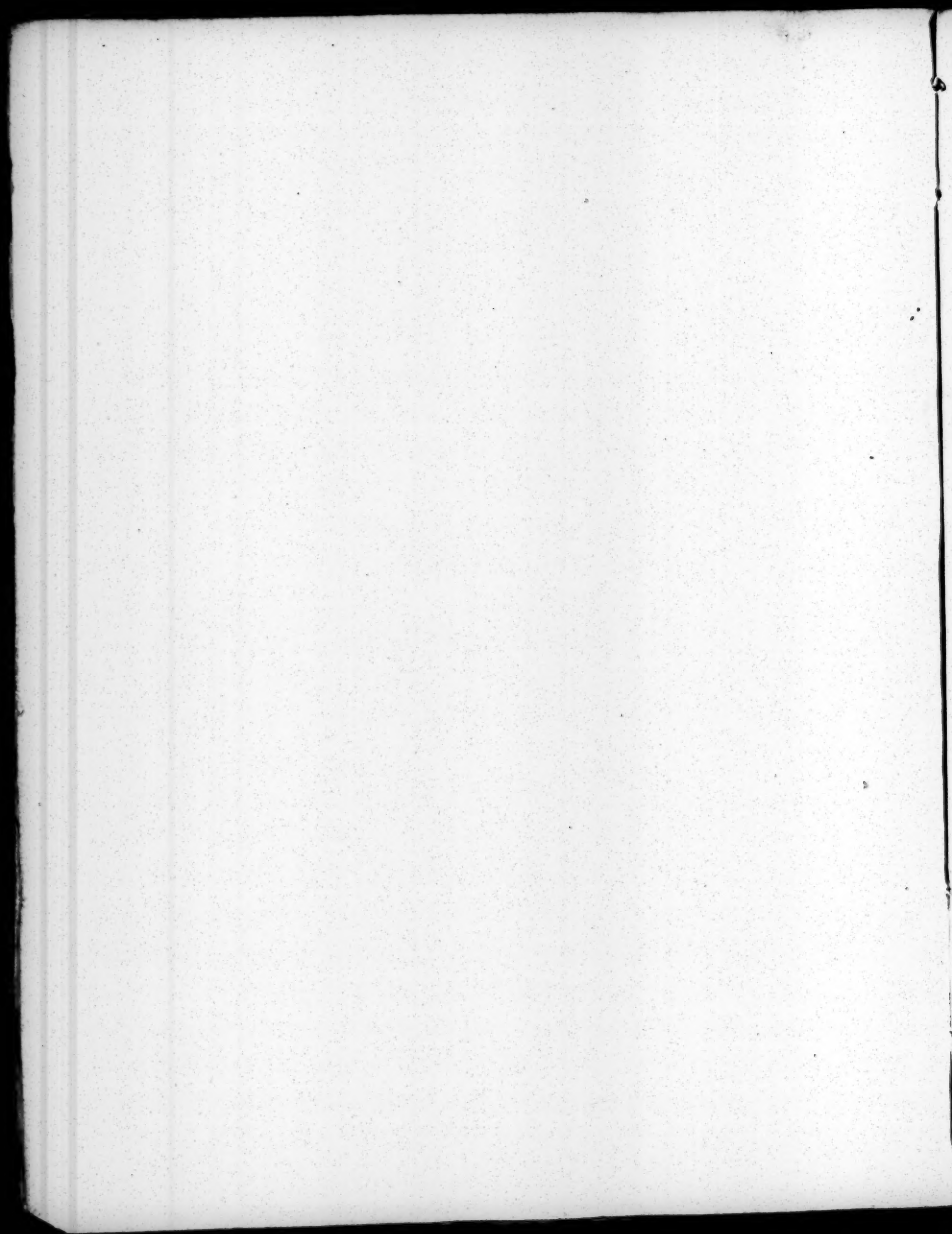
And the third is, the knitting together of all the foure Parts, for managing rightly three things, in the Invention and practice of Saying. With this caution and *Proviso*, That wee doe not so much follow the Invention of Men, as thereby Gods workes bee unregarded, which God forbid.

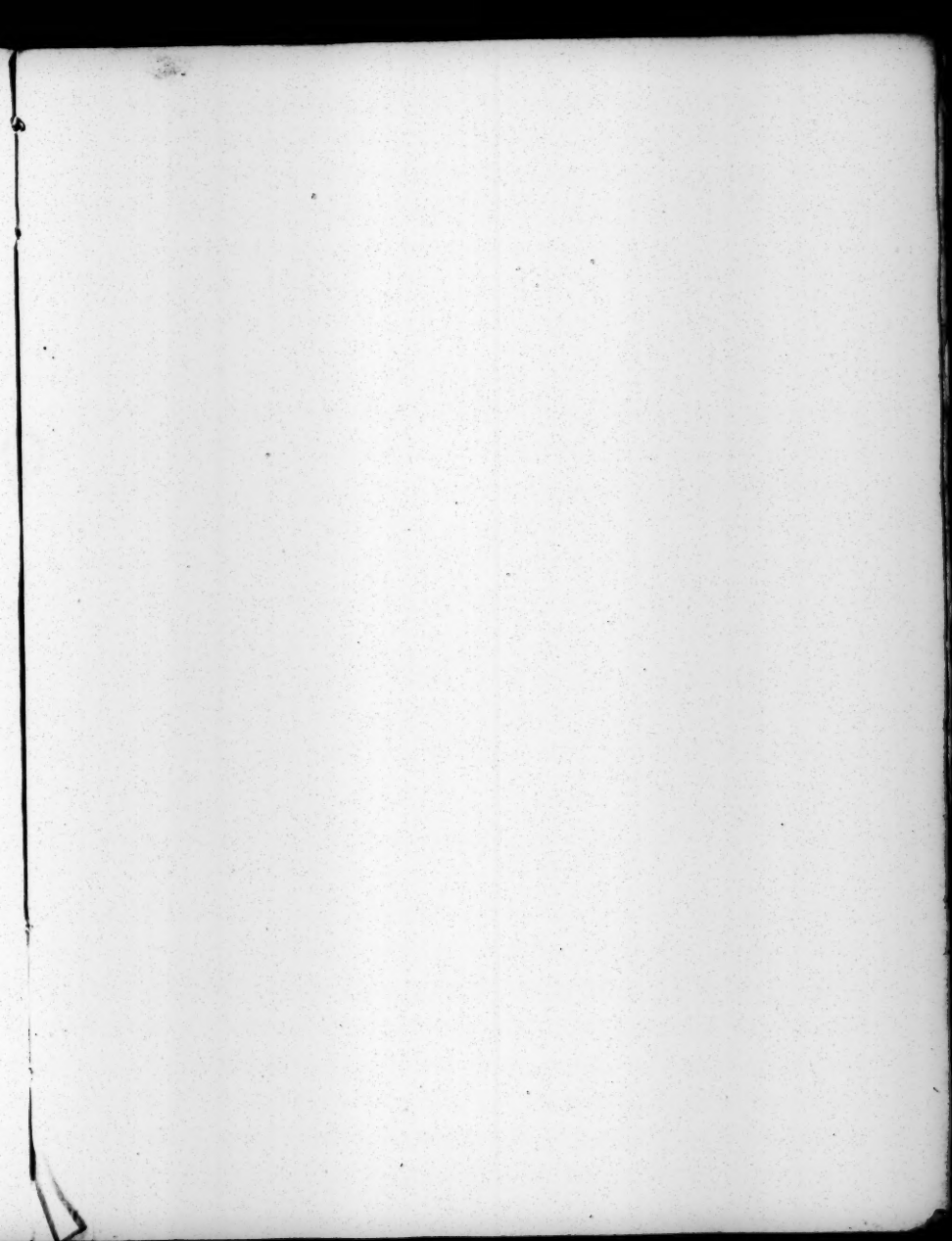


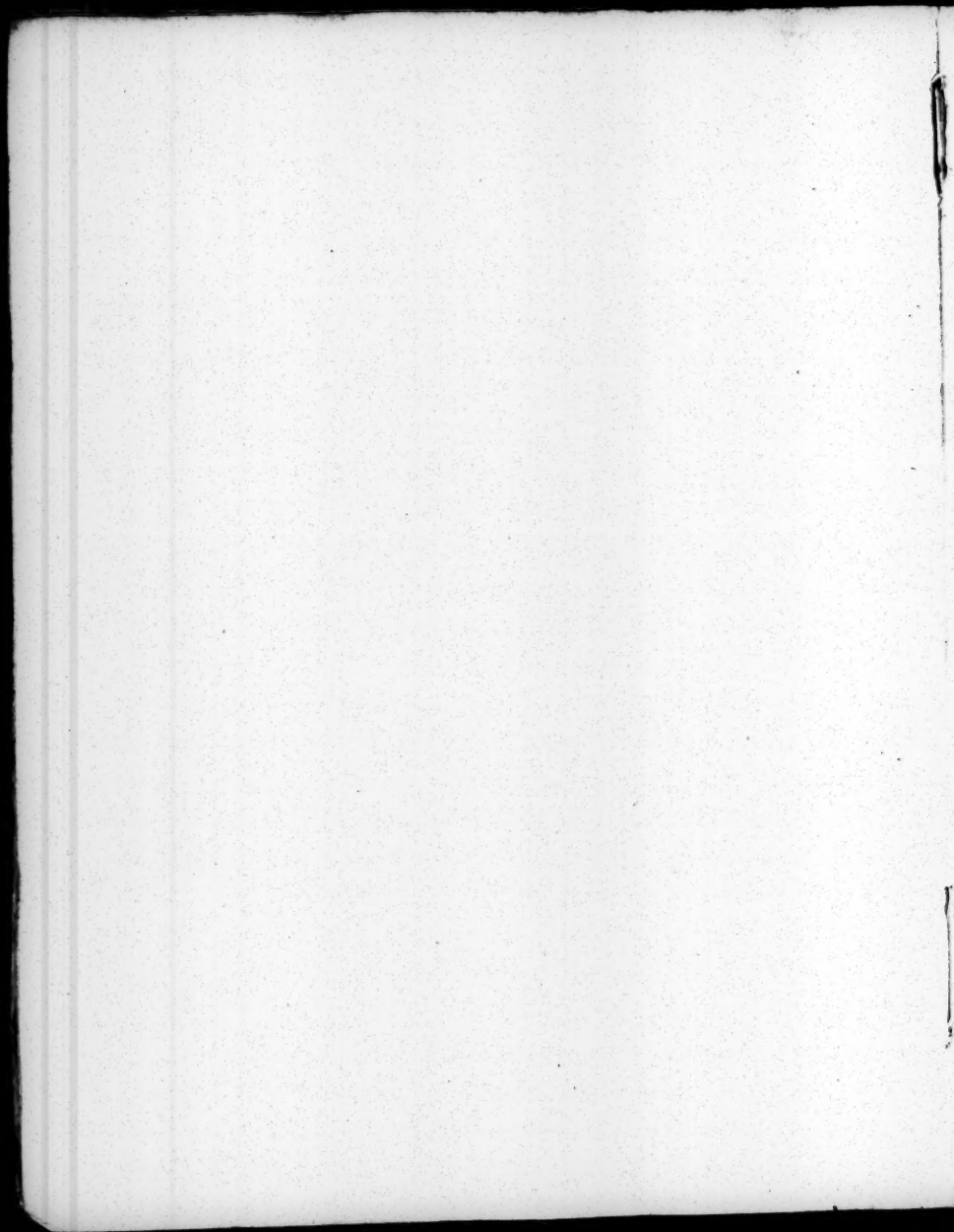






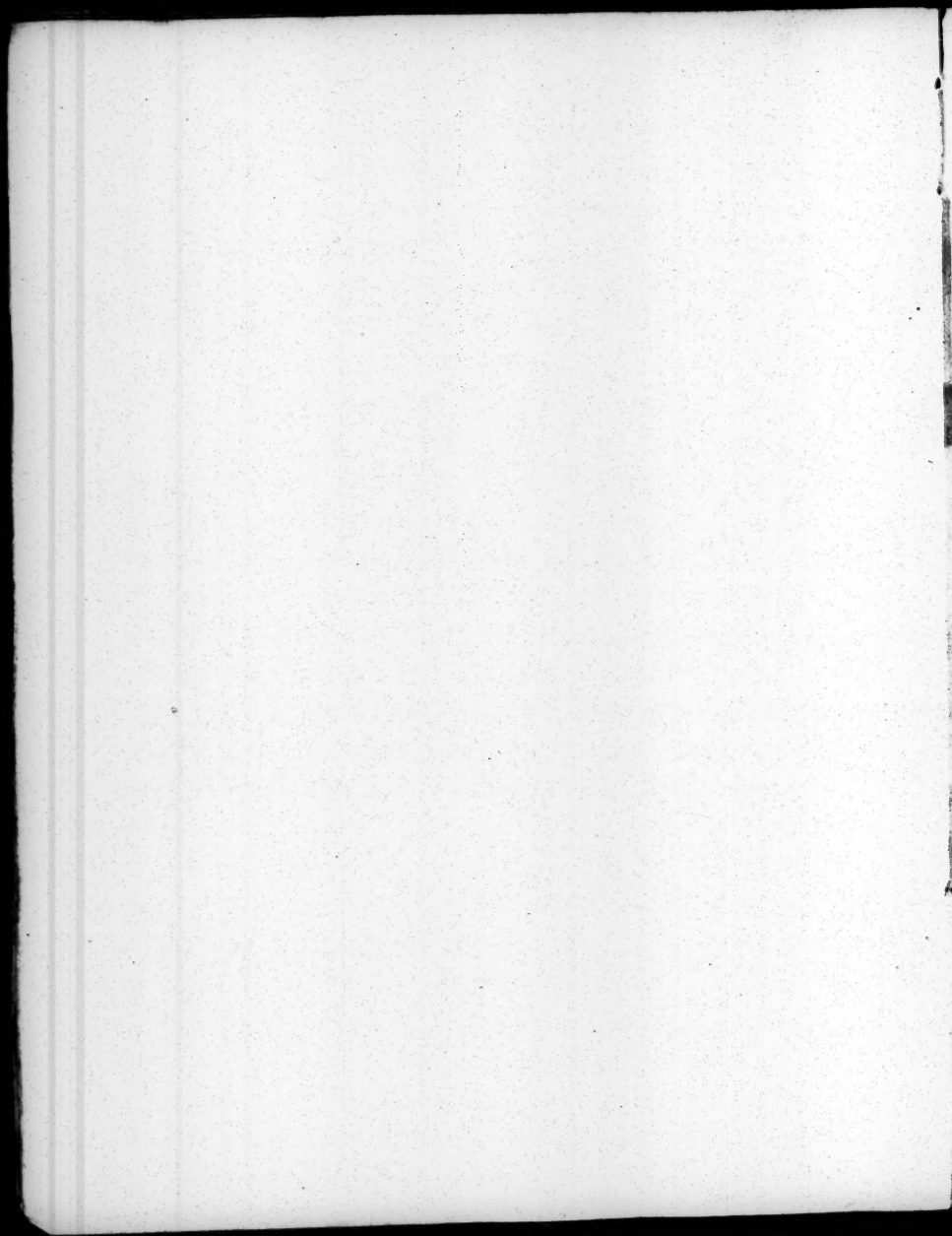


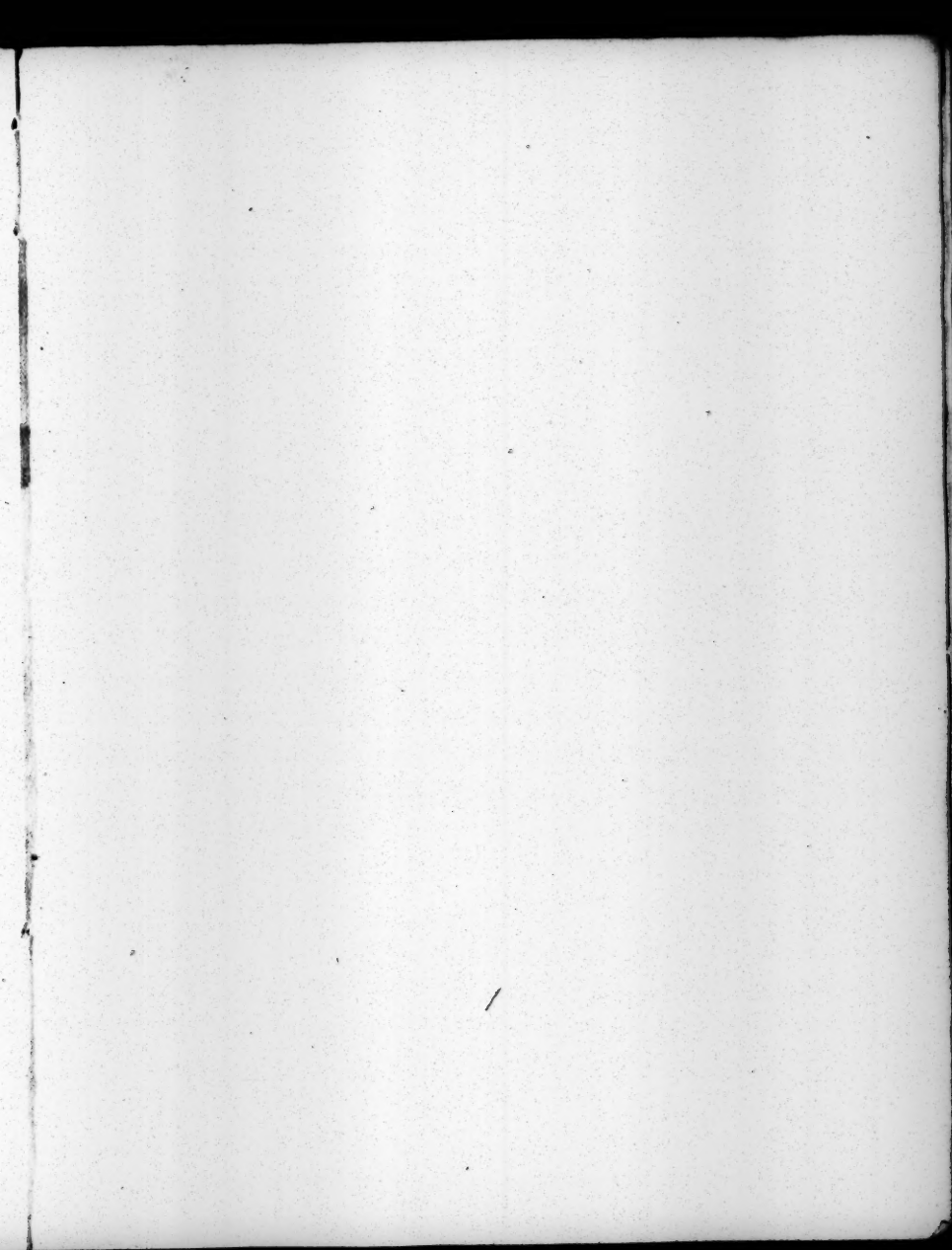


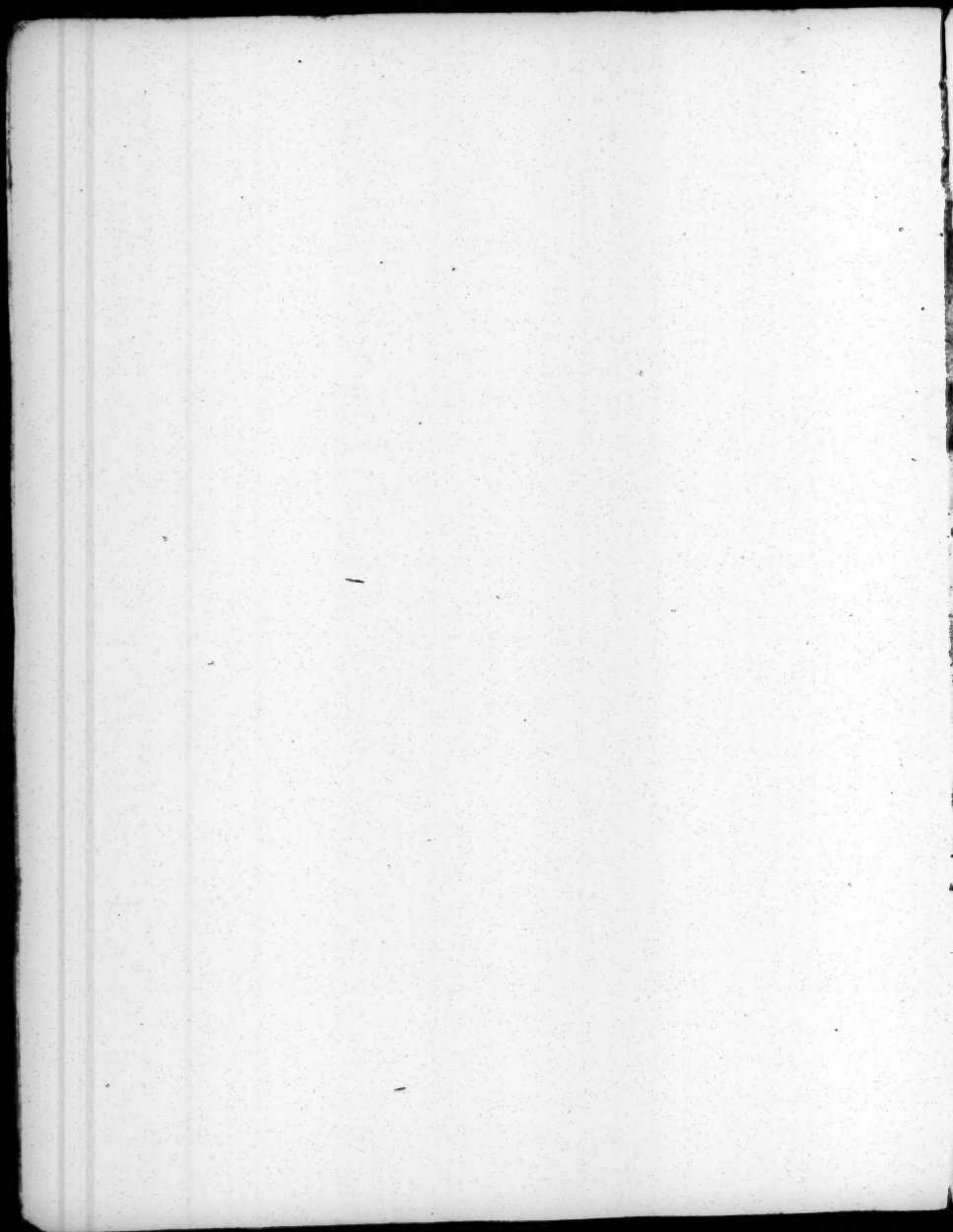


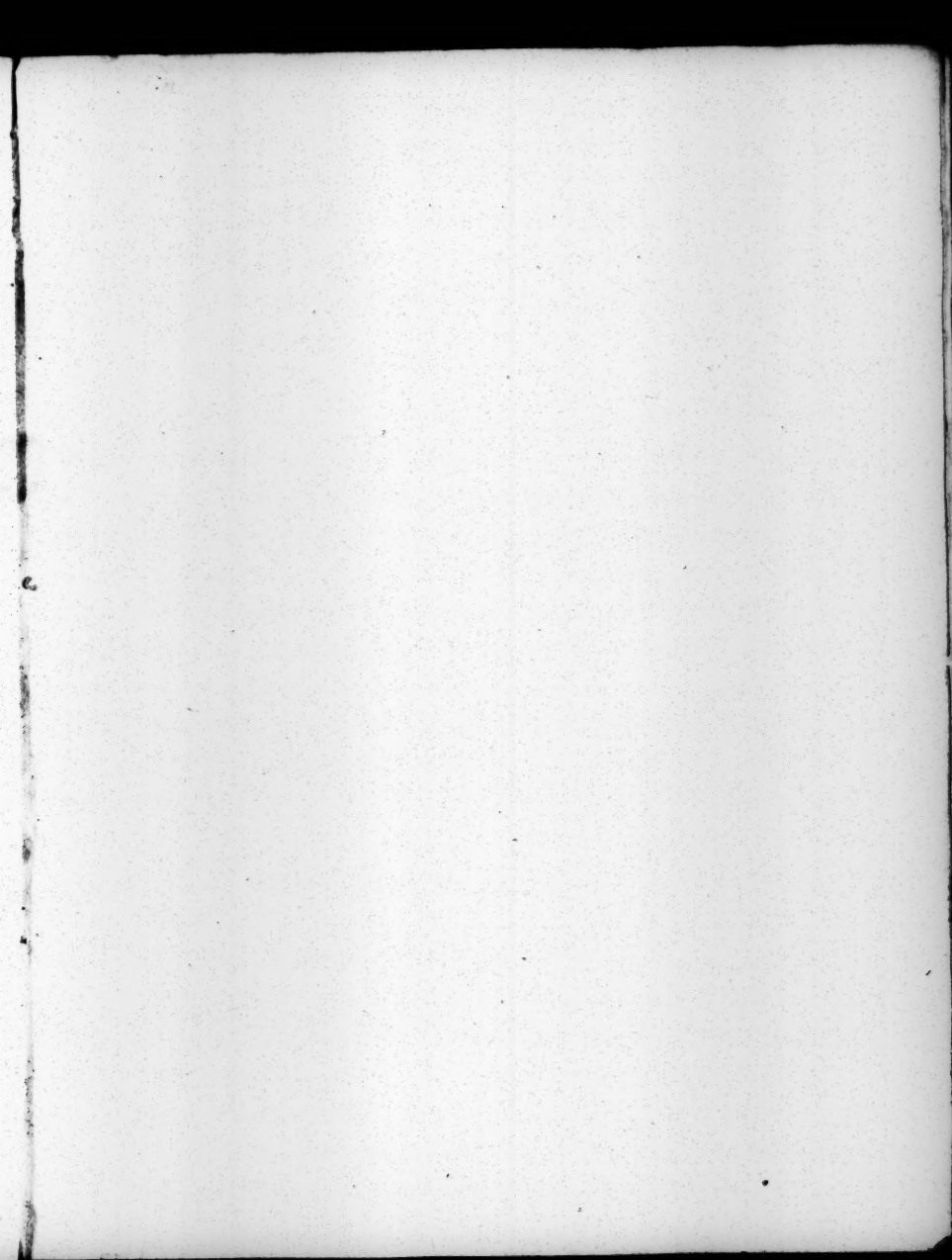


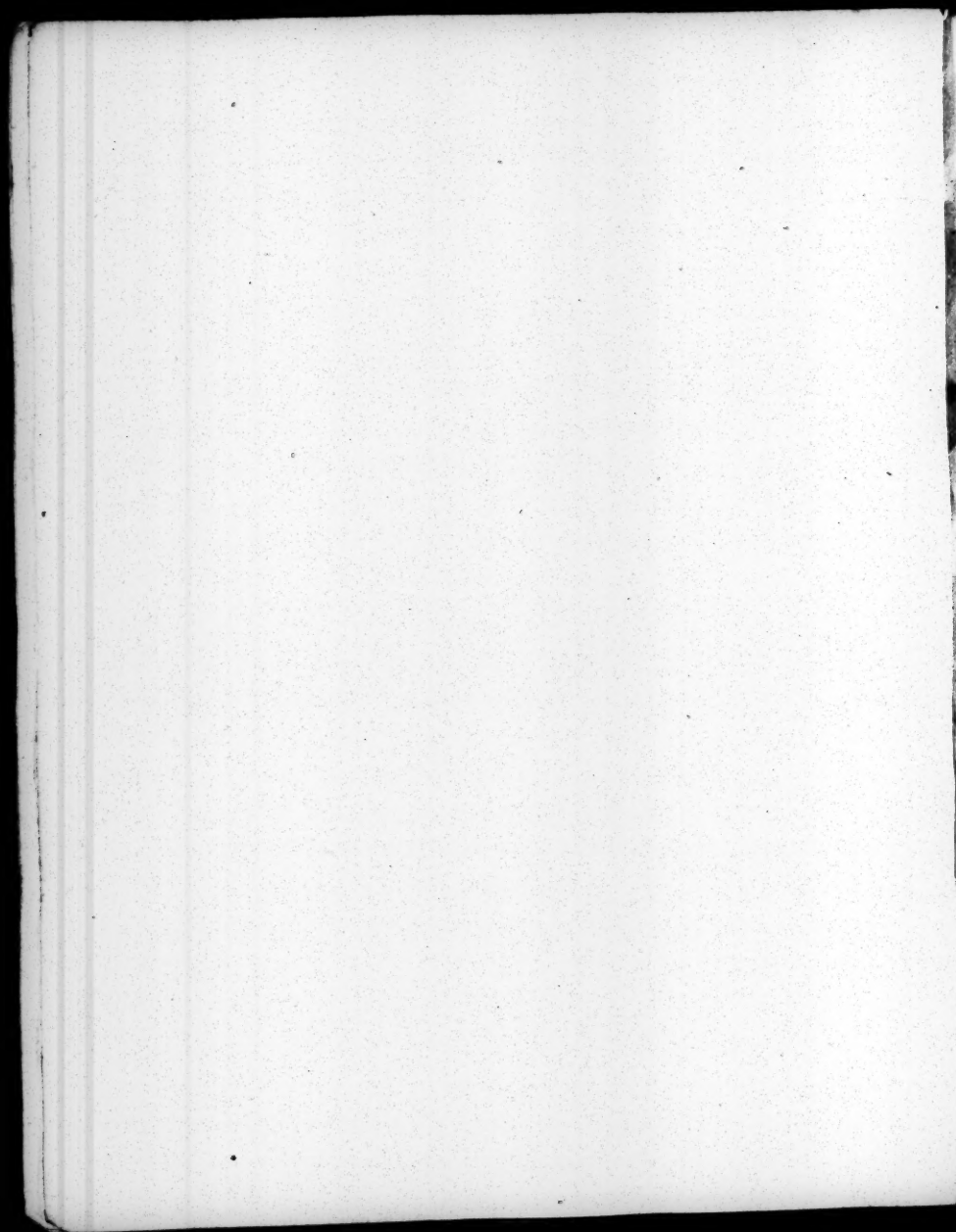






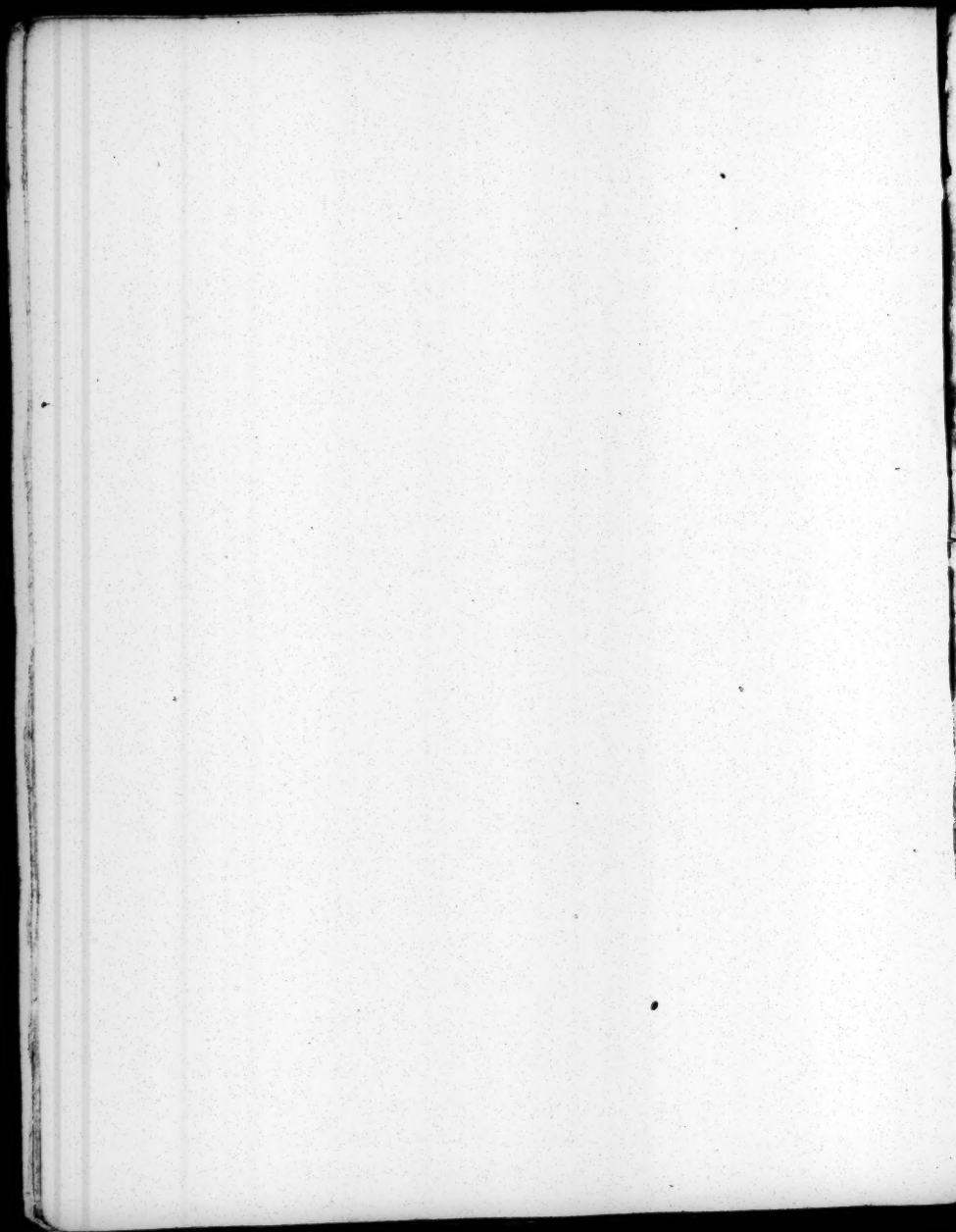


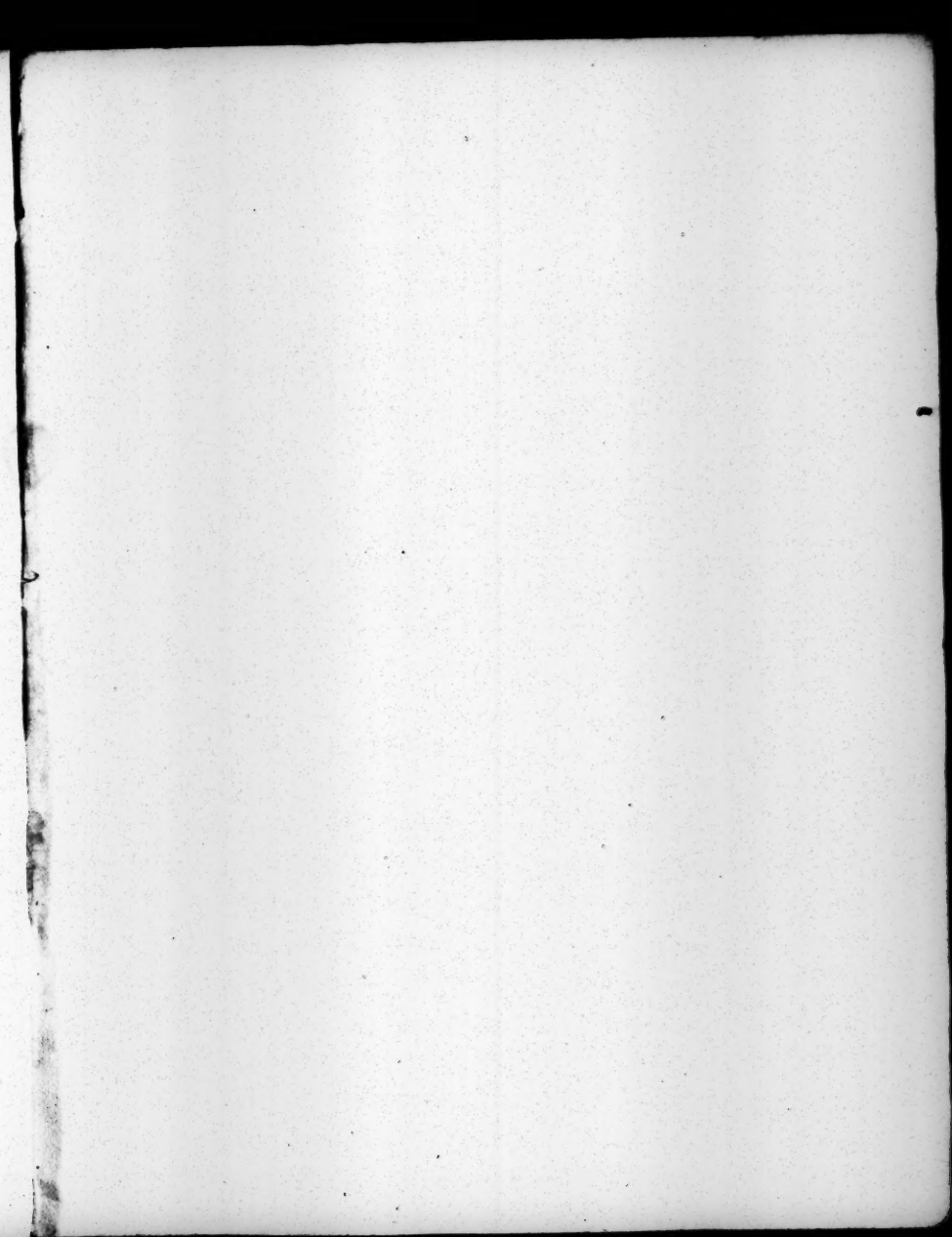


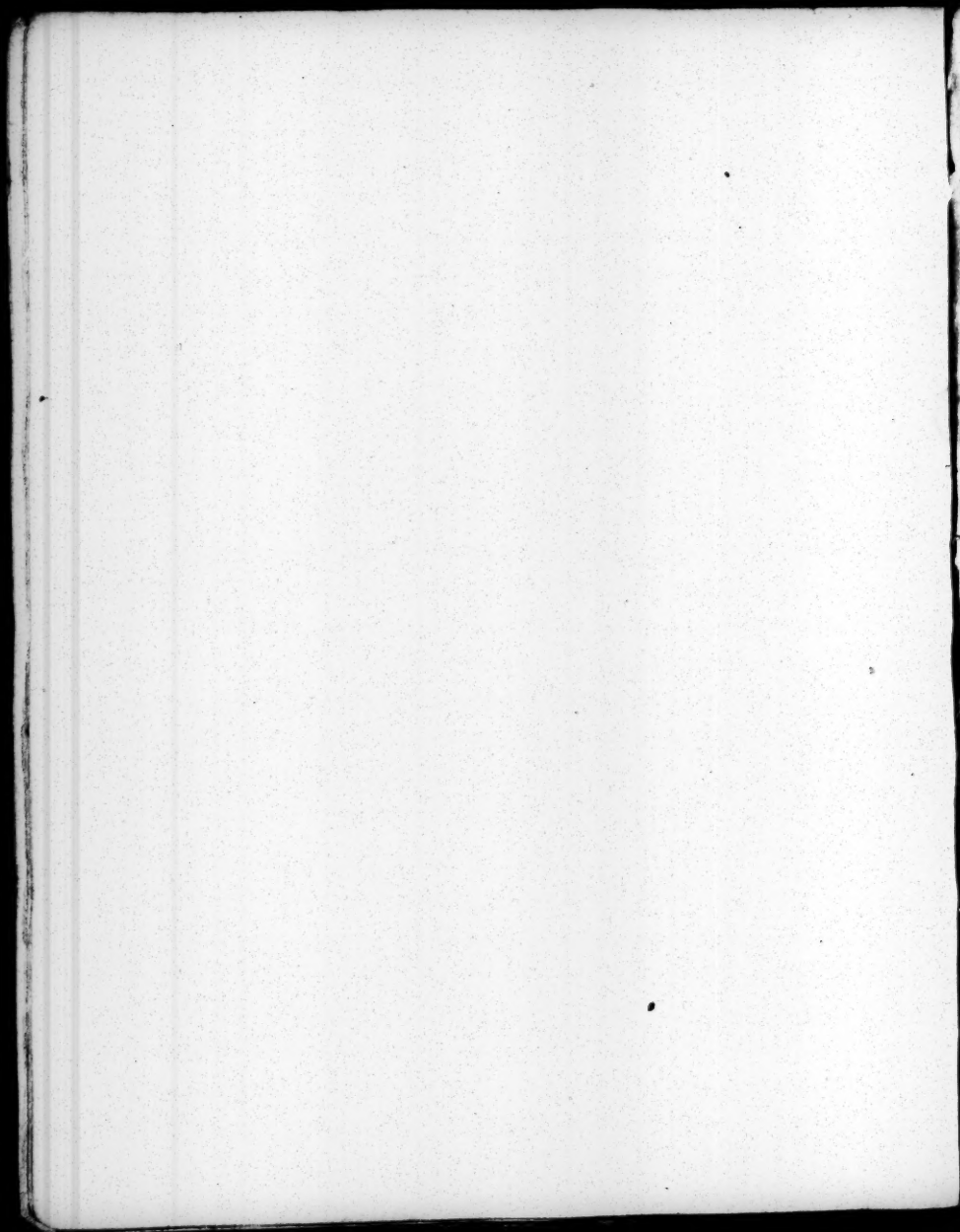


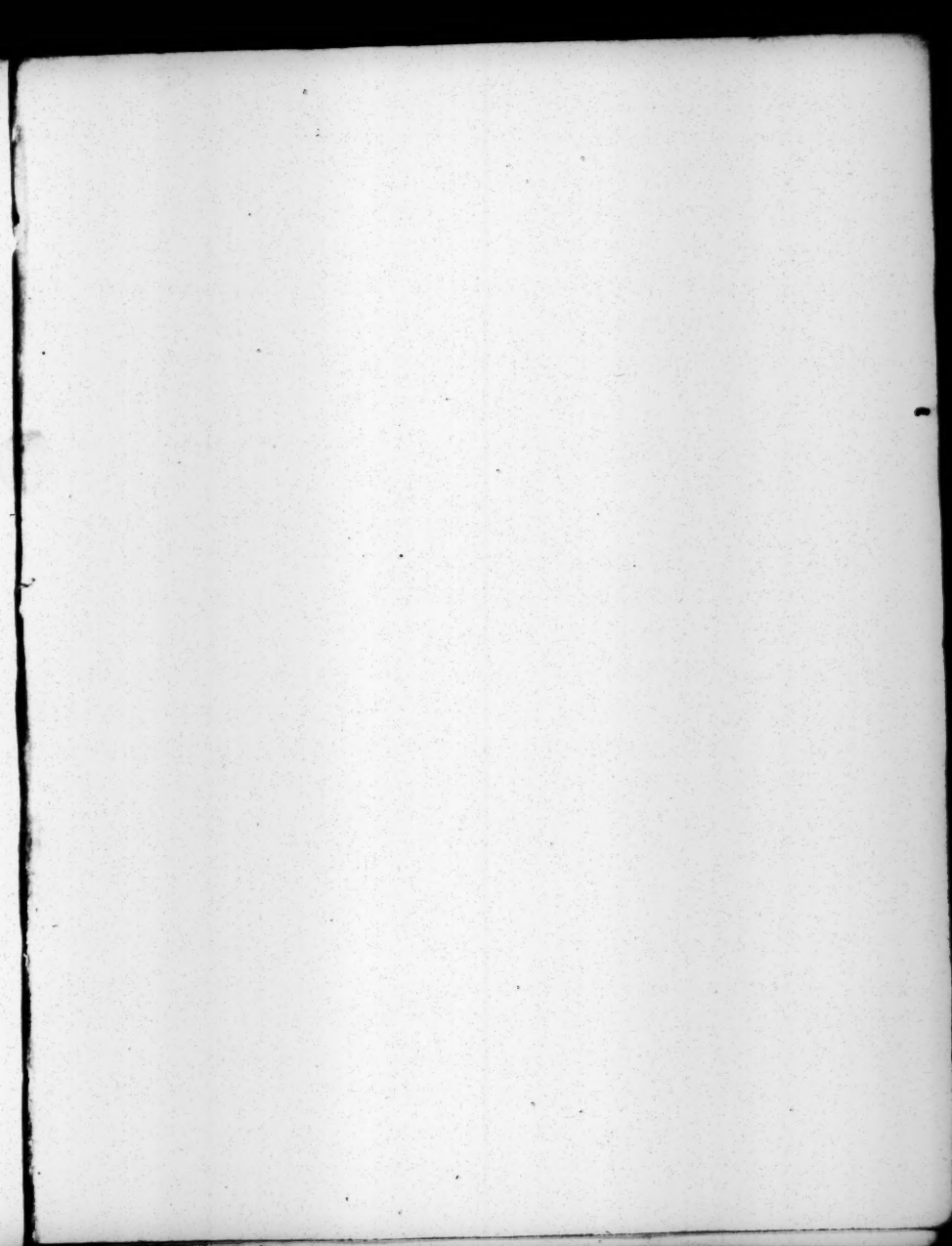


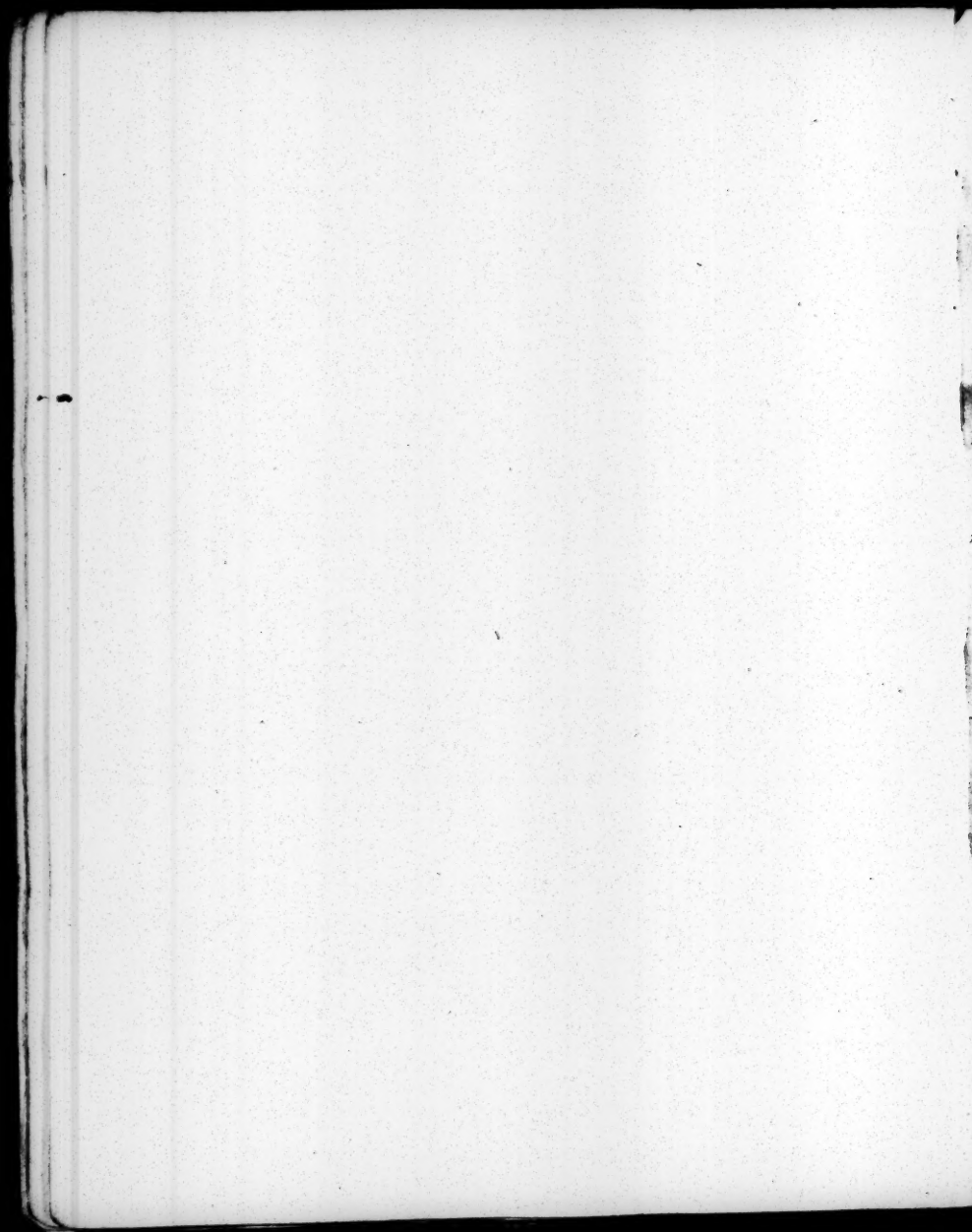






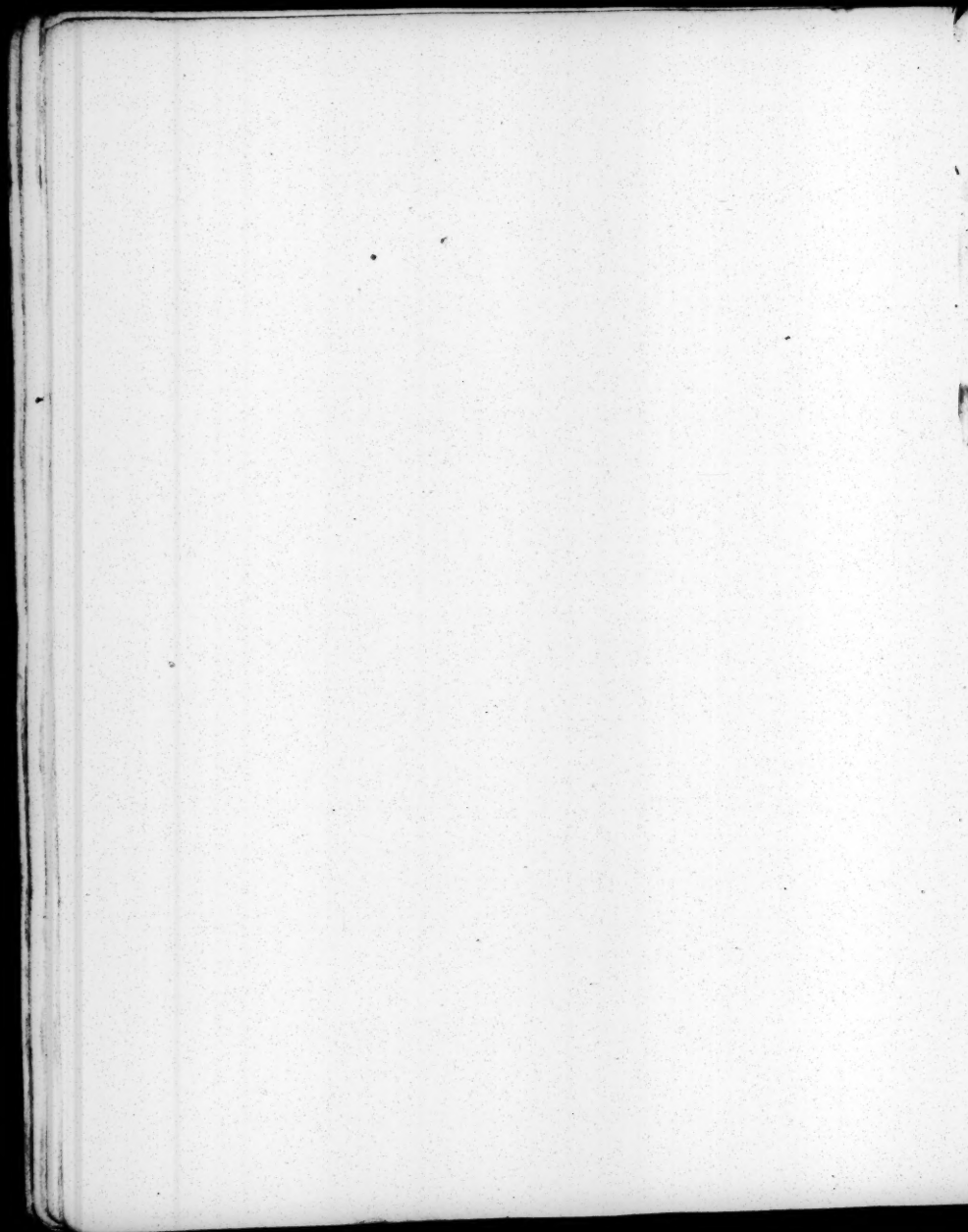




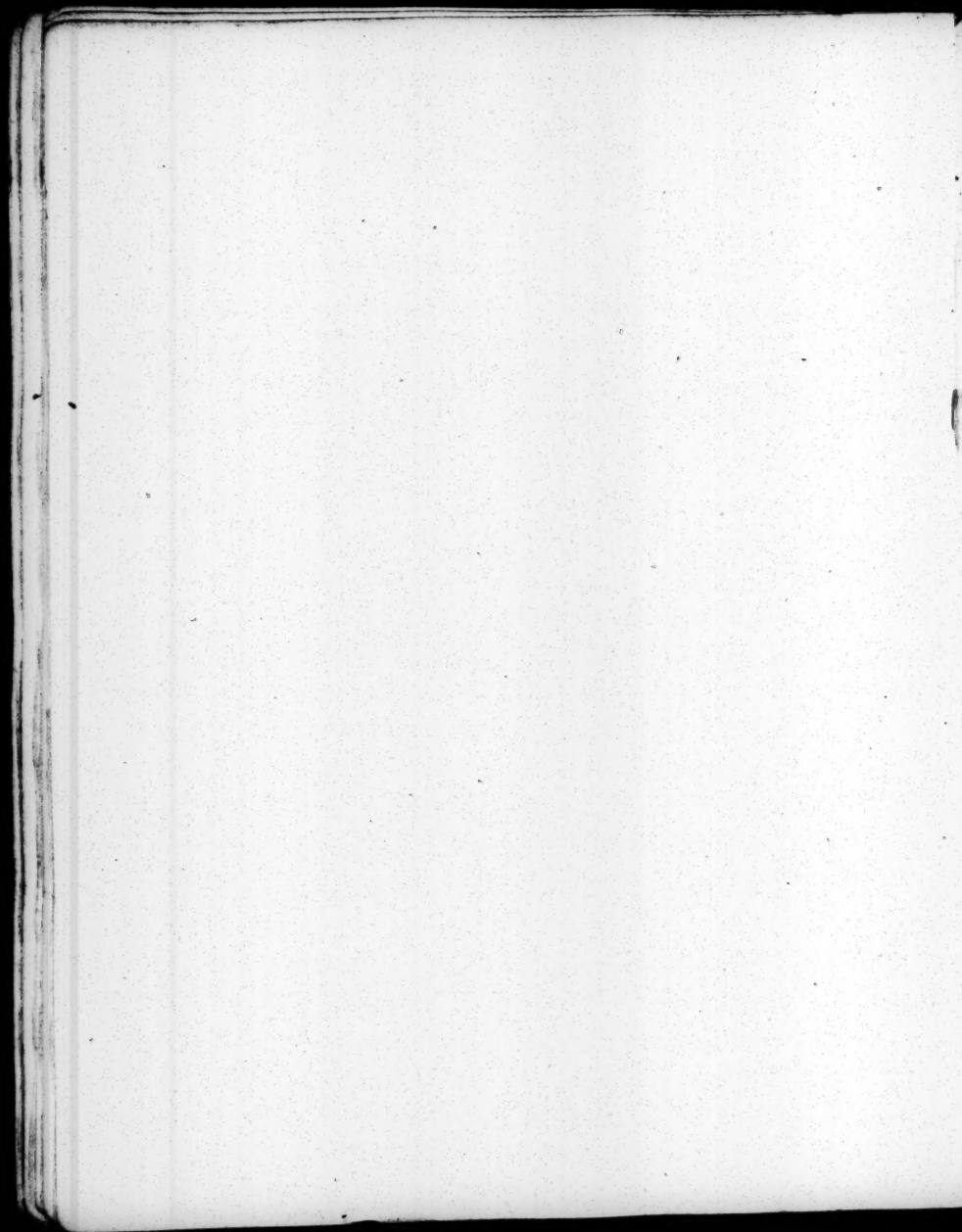




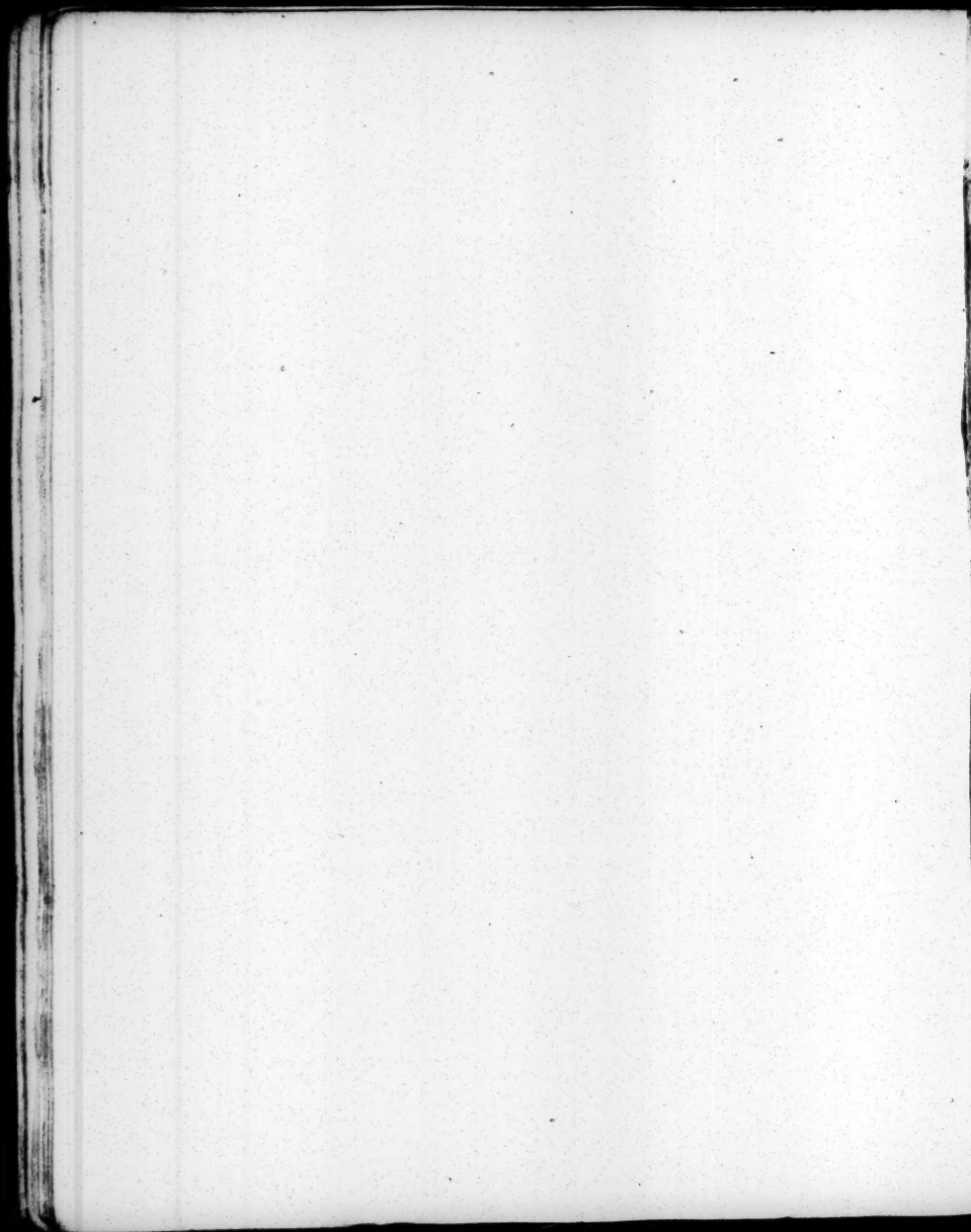






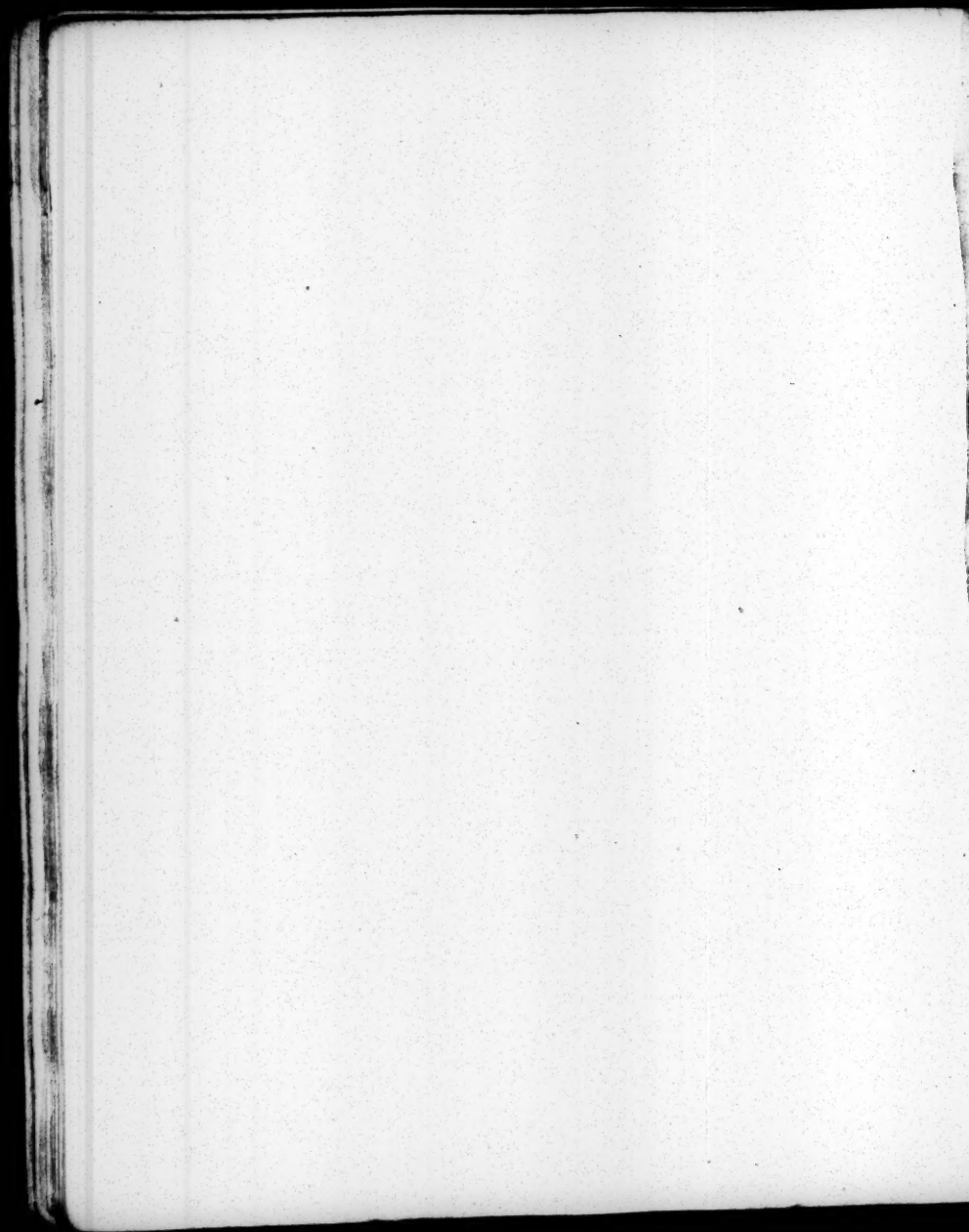




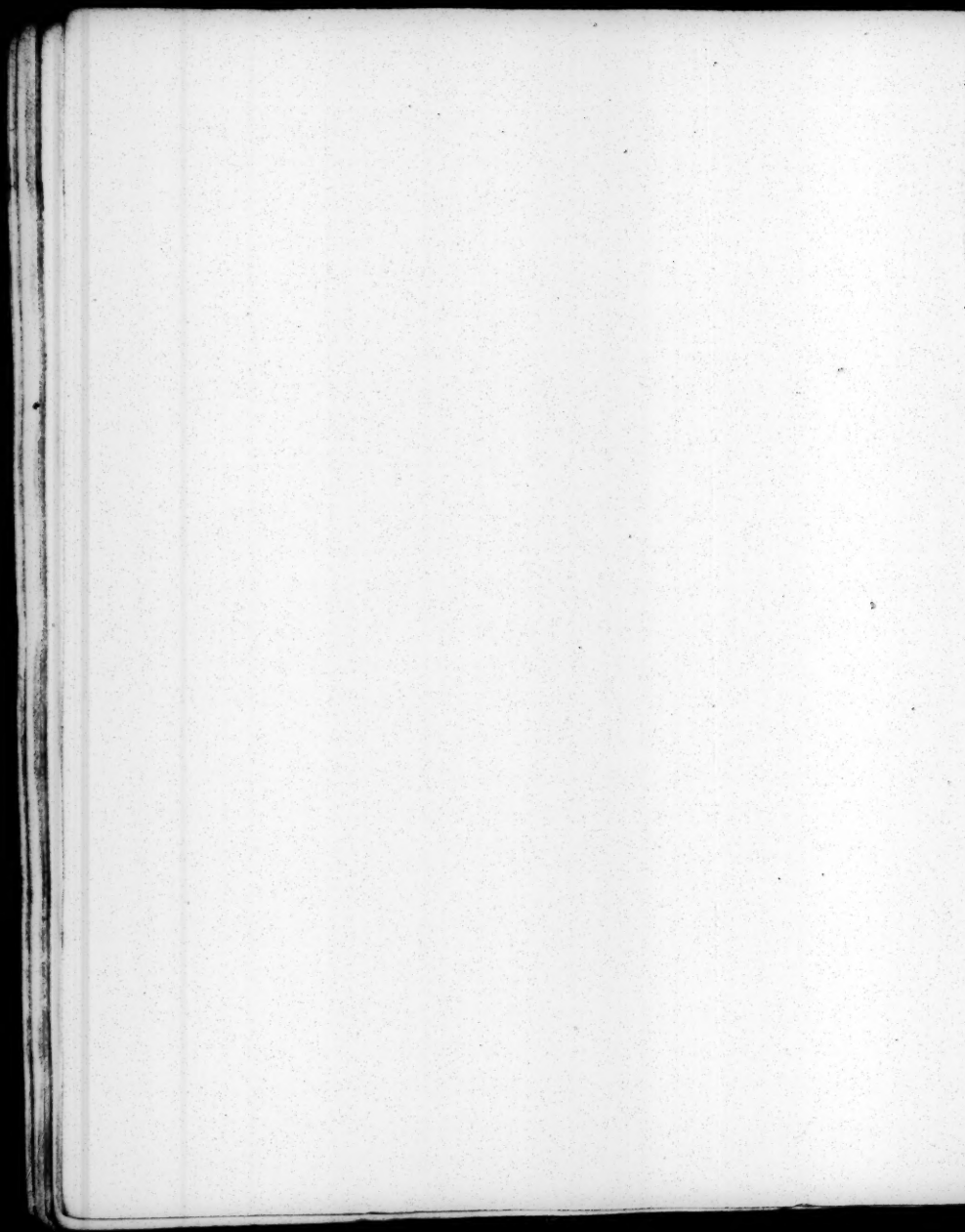








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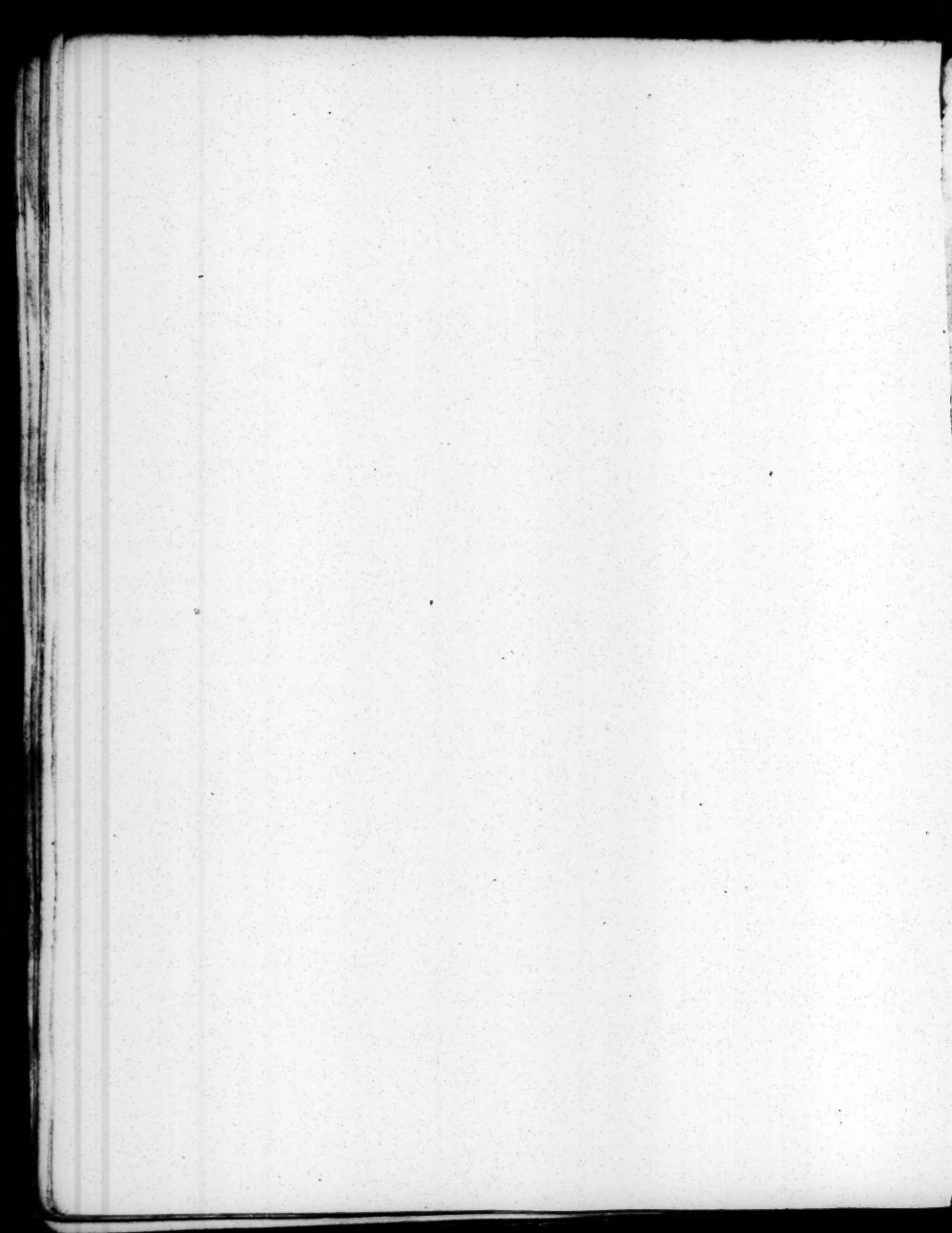


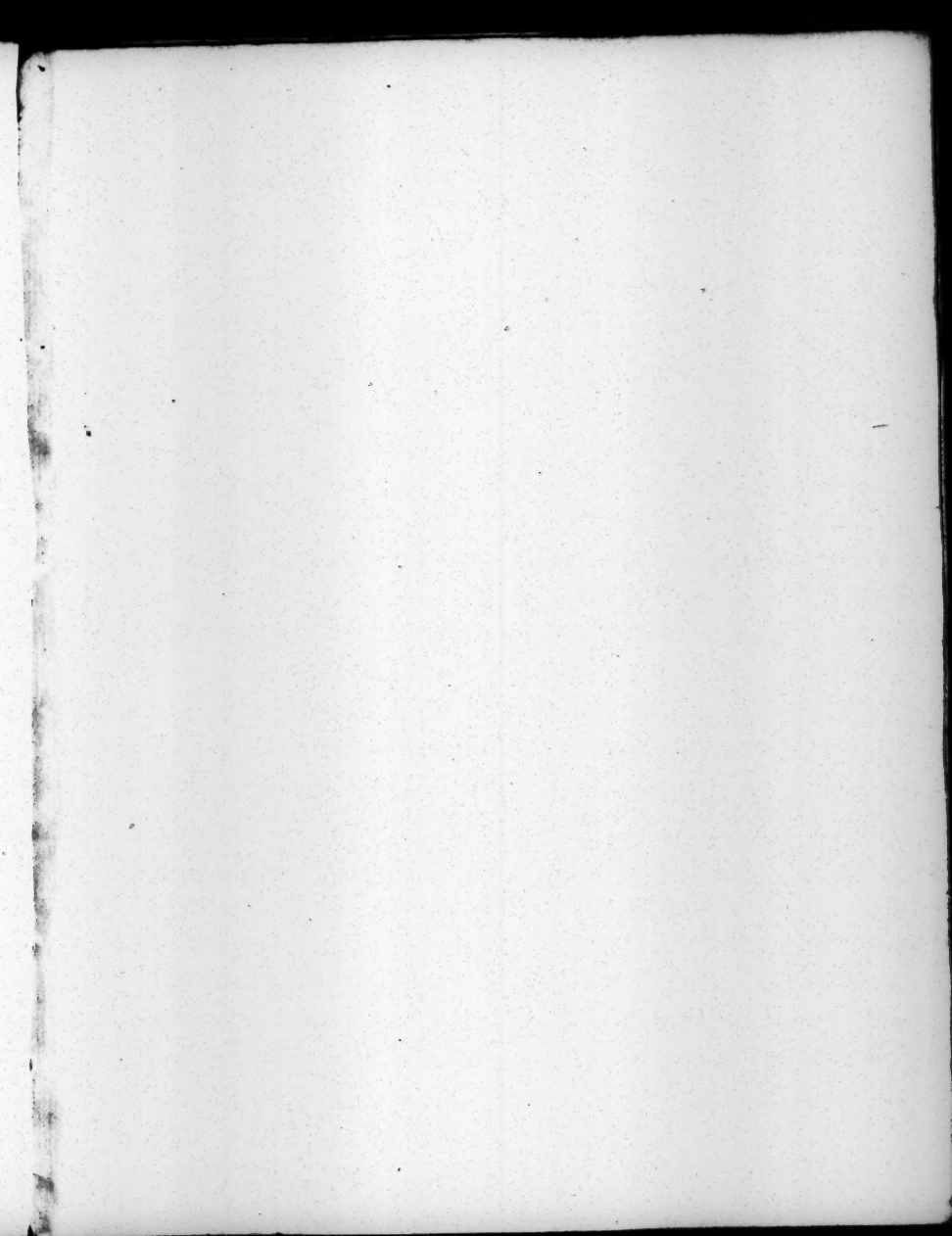


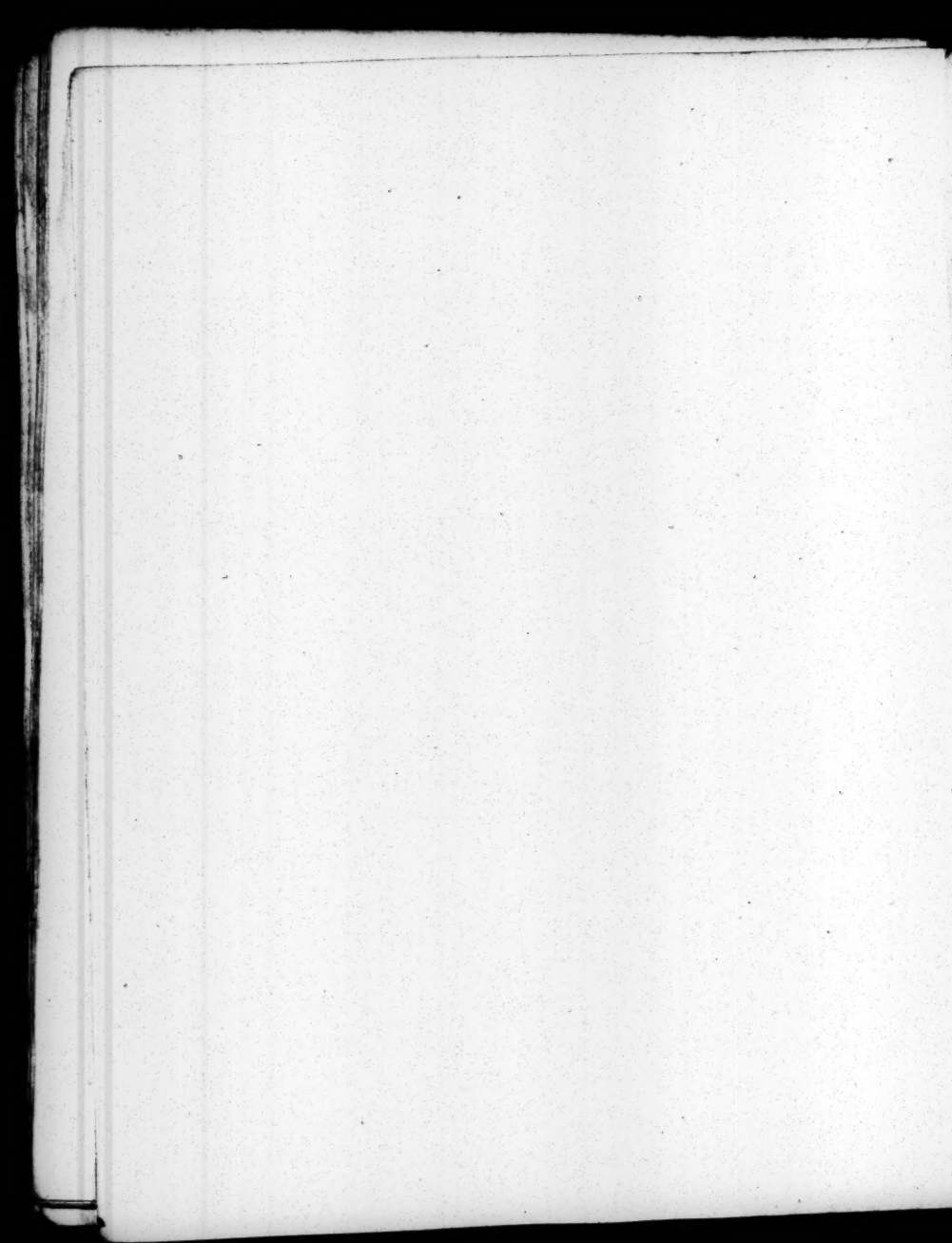




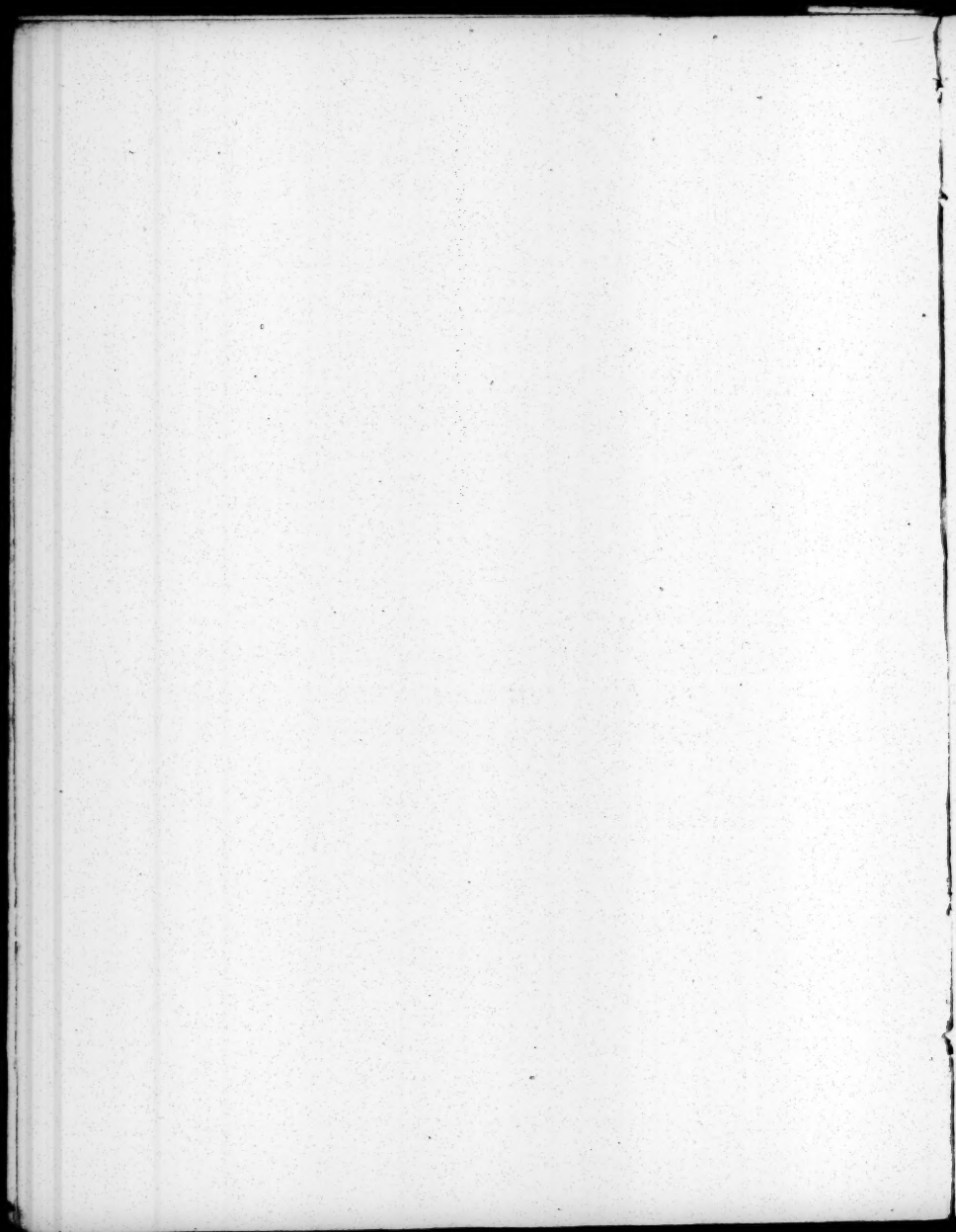




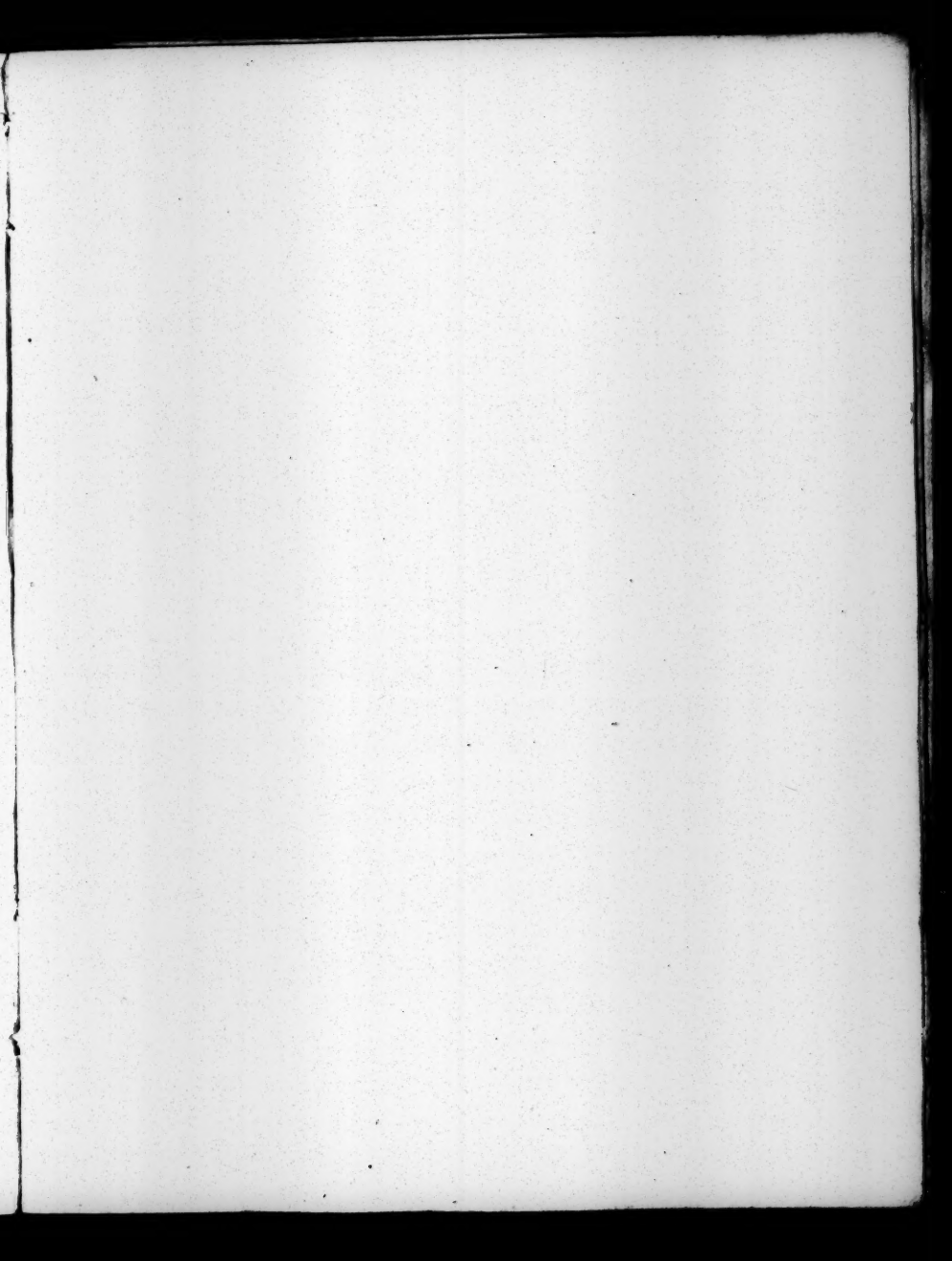


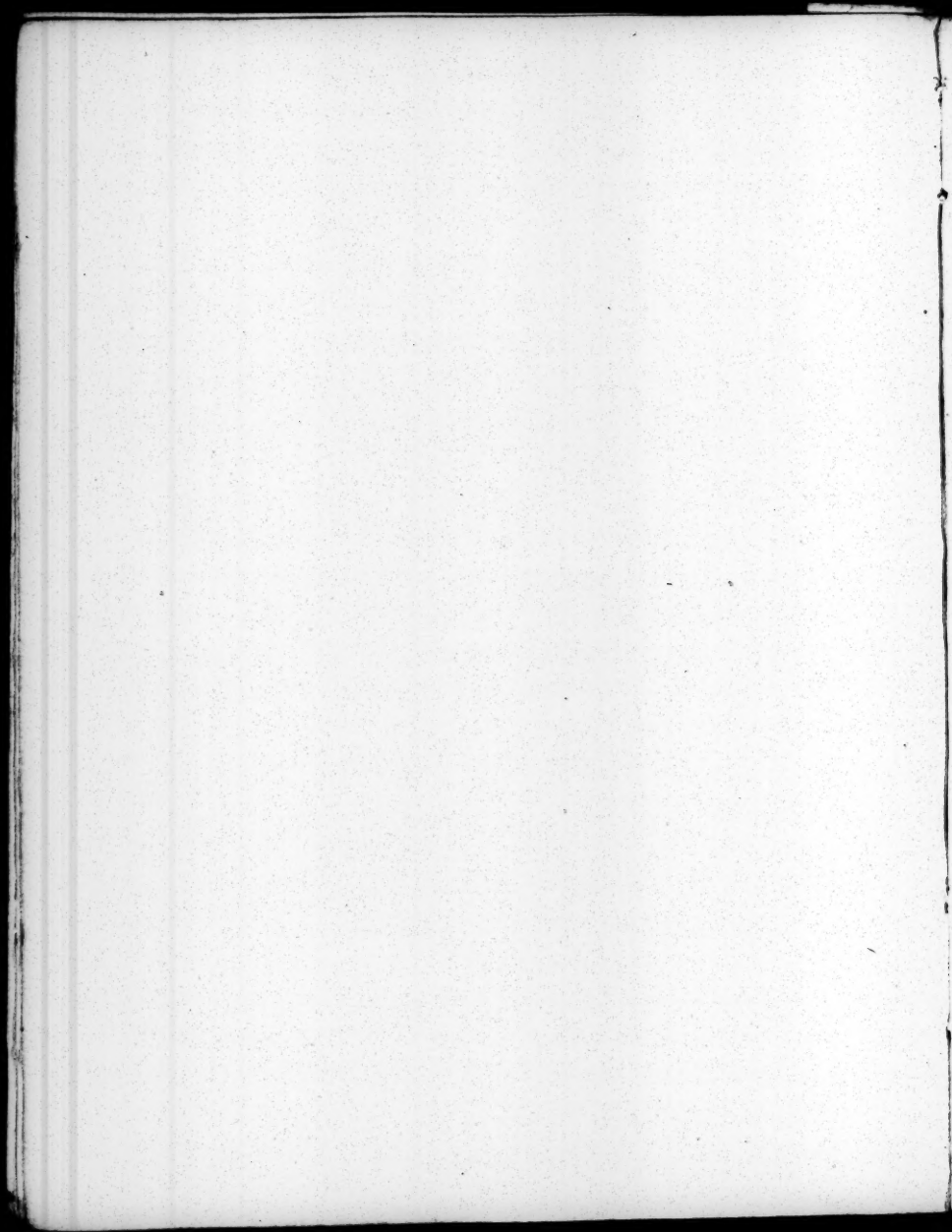


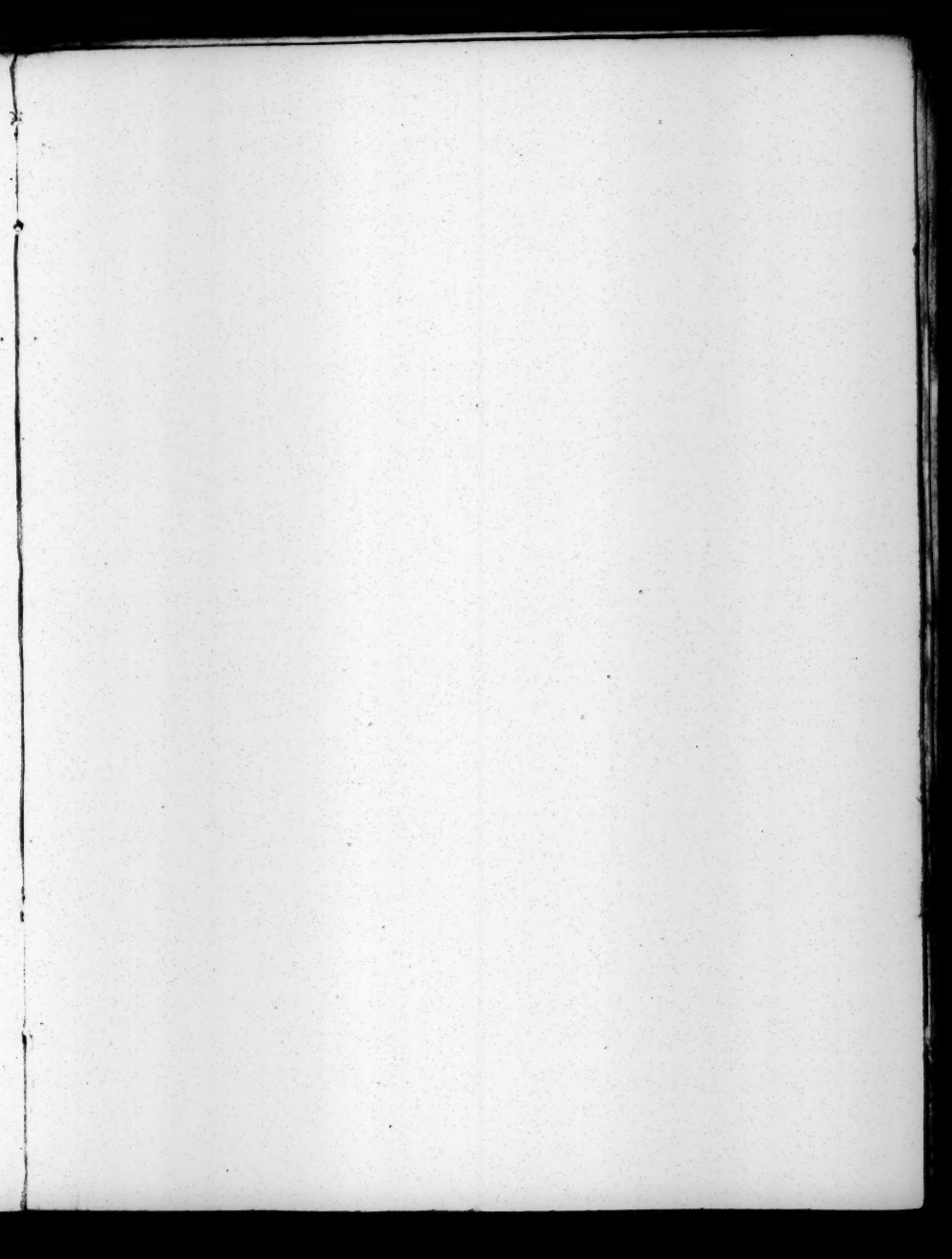


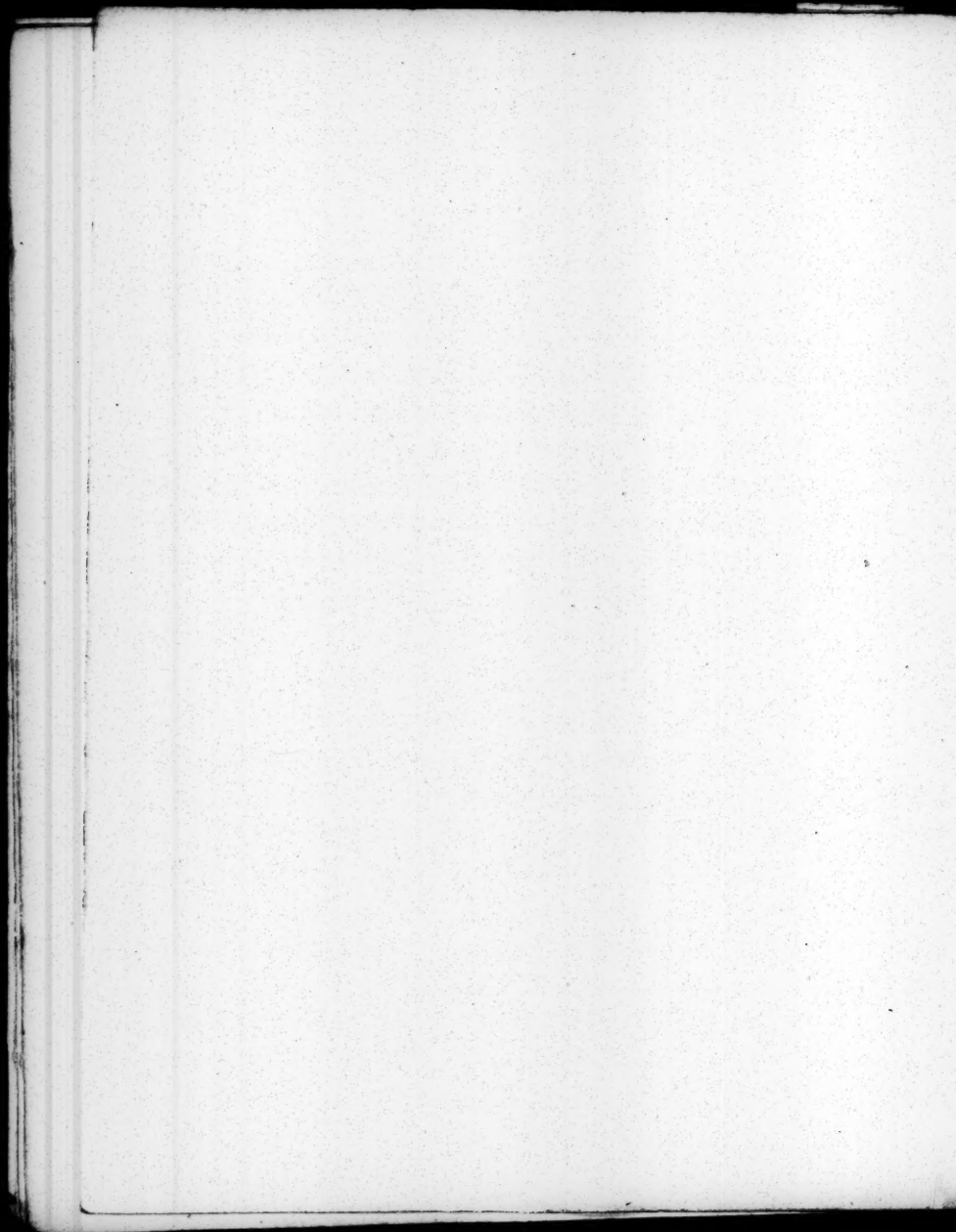












# The Golden Art of Enriching with

*Musæ Regnantes* and the Discipline

of Gods Elect; By J. S. P.

*Consilium do tibi ut emas, &c. Apoc. 3. ut Dives fias.*

To the good Ministers, the just Lawyers, and wise  
Physitians.

## SECTION, 1.



Common-wealths are like mortall bodies, they have their growth and perfection, decay and corruption. A Common-wealth is *Vigetable*, *Animall*, *Rationall* and *Divine*: wherein some are too witty to be wise, too strong to be just; and too rich to be good. They are often too witty to bee wise indeed, that have a quick wit and a bad memory, for they (sometimes) are the fittest Instruments for the Divell to worke upon: They are too strong to be just, that had rather steale then worke having strong limbs, make war their only Art and profession: and dame *Cerces* that sits at the barre of sensuality practising nothing but to pamper herselfe, and be with her guests; is too rich to be good.

The Marchant, Husbandman, Tradesmen, Artificers and labourers employed about the goods of Fortune, are the *vigetable* part of a Common-weale, but if this part be not well ordered and regulated by the other three parts, it will bee, *Terrena, Animalis Diabolica. Ja. 3.* A whole thing is of more value then any of the parts; for it is equall in value to all the parts taken together, both in quantity and quality: therefore you three cannot be better then the Common-wealth consisting of all the parts together, but no doubt you are of the three last and best parts.

For the wise Physitian is a profound Philosopher, knowing the verities, causes and effects of things; he hath cure of the bodies which is the *Animall* part; & is intrested in the *rationall*, which is the mind and naturall reason, experience proving, that the passions and perturbations of the mind must be ordered, the affections settled and brought to the vertues of patience and humility, else the body is not prepared for cure.

The good Minister is abundantly rich in heavenly Graces, unto  
a 3 which

The Christian's Jewel

which all other riches are no way worthy to bee brought in comparison: he is Philitian for the Soule, which is the Divine part of the Common-weale; he is intrested also in the rationall part: for to suppress time, vice must bee plucked out, both rooe and branch, and morall vertues laid in by the help of right Reason; and though those morall vertues taught of the heathen Philosophers, be but as dung; yet being so, therein may be planted such divine vertues as may bring forth plentifull fruits of the heavenly Graces; and as sin aboundeth though unto death, so shall grace much more abound even unto life eternall *Rom. 5.*

The just Lawyer is a profound Politician, well skil'd in naturall and divine Philosophy, the best moralist, and therefore has is in the rationall part of Common-weales, and he is intrested in all the other parts; for those that neither diseased body, nor the worme or sting of Conscience can rule; will yet nevertheless rule themselves for feare of the Law: but some neither afflictions, Law nor Conscience can rule: in such desperate diseases, the great Doctor St. *Paul*, prescribeth this: *Quos tradidi Satana: Quare? ne sint Blasphemi, 1 Tim. 1.* For there is a present stop of the diseased mind: if they sin not against the Holy Ghost, then they are in possibility of cure.

Now this book teacheth as well the Raven Mony-Master, that sweepes all with his great broome, and the Daw that fethers his nest at a groat the pound, and vendeth the same at 4 ounces for six pence at the least, making these the richer, and the other better: As the cunning Rookes of all sorts; how to know riches well, and so to chose the best, to keep them safely, and to use them rightly: and how the poorest may have sufficient; but I desire you to pray with me, That the poor may have sufficient, and that the rich may not have too much: least these like overladen beasts, be not able to lift up themselves to honour their maker: and that the other may have wherewith to cover their naked simplicity and innocency, and to feed their bodies and content their minds.

And let us all heare and take Counsell at God. *Apoc. 3. Ergo quocumq; amo, arguo, et castigo: Forvegitur, et respisce; nam dicis dives sum, et ditatus sum, et nulla re mihi est opus, neq; nosti te esse Aurumsum, et miserabilem, et pauperem, et cecum, et nudum. Consilium do tibi ut emas a me Aurum igni exploratum, ut Dives fias; et vestimenta alba, ac induaris, nec manifesta fiat pudenda unditas tua: et collyris inungas Oculos tuos, ut videas.*



of Enriching.

But if to be in d & mi next: then we sing la just in c. according to f 3<sup>rd</sup> & 6<sup>th</sup> Scale, flat sharp & meane. And ab by f lines & spaces you may see 12 notes: these include the 3<sup>rd</sup> portions Geometrical Arithmetical & Harmonical, in these numbers, 6 8 9 12.

Common sense is stated in § 374, as a receptacle for all objects outward & inward: memory behind, keepeth the records of things past: Cogitation with prudence in § 374, rated master of y<sup>e</sup> affections.

Will! with Justice & good Conscience in y<sup>e</sup> brest; having  
prudence & fortitude more ab a good Commander Governed  
well all y<sup>e</sup> affections, vitall & animall spirits; ab a ration<sup>all</sup>  
man, & valient Cap<sup>t</sup> he expects winne such a sinne: and thus  
I am hold to possess y<sup>e</sup> Divine vertues, & vertues of the  
minde: By direction of understoinding, y<sup>e</sup> chiefeaine! who  
holdeth his court at Dabone.

So our understanding is guided by y<sup>e</sup> holy ghost sent  
downe by h<sup>y</sup> & attended by common sense memory fortitude  
temperance & judgment; & so he is lord paramount in microcosme.

Thyng 1 Commonſence 2 memory, 3 Cogitation 4 Will, and  
5 Underſtanding; I call I alſo the facultie & power of our  
Soul. Theſe 5 heathen philoſophers ſay, by 5 vertues morall  
naturall & diuine. They alſo confeſſe, if 5 corporall facultie  
& humours of 5 body ſpray: then 5 paſſion will be inordinat,  
vertue expell'd, conſcience (as e- as it were) aſleep, & underſtan-  
ding ſtill, iudgment with all goodnes voyd. The Will working  
by humane Reaſon, ad 5 beaſtiall part of 5 Soule, all be-  
vnereaſonable & moſt vile thing.

And we Christians find Job 9 v 21: 10 v 9: 12 v 10 I such  
great imbecility in our depraved natures. I am now borne about,  
only some very small inclination we have to do us well, but too  
weak to help it self. Therefore we are glad with Seneca, to  
bring into this demonstration, but a little of I v 21, & I for  
comfort from all filth, that these virtues may shine also I  
more here with us.

8<sup>th</sup> we assumed all but that Rational right line D O and  
 make  $\frac{a}{b} = \frac{c}{d}$ ,  $\frac{a}{b} = \frac{c}{d}$ , and finish  $\frac{a}{b} = \frac{c}{d}$  triangle  
 $\frac{a}{b} = \frac{c}{d}$  to say it equal  $\frac{a}{b} = \frac{c}{d}$  so finishing the head  $\frac{a}{b} = \frac{c}{d}$   
 $\frac{a}{b} = \frac{c}{d}$  equal to head  $\frac{a}{b} = \frac{c}{d}$  as in  $\frac{a}{b} = \frac{c}{d}$  finish.

## The Golden AR4

- Because y rightline, n<sup>o</sup>. 13 Rationall & Cut in this Divine operation & y side of y Triangle a b c are these Seagreements. therefore y whole with y parts are in a Divine Ratio & so are inexplorable but know by some Divine vertue for their many properties & vicissitudes.

But because y life are long & mans life so short therefore briefly first we are to place a naked symmetry at c in y start with a pure & gillless Innocency (among men at least) in y Brest and so with aged consciences taking onely 3 vertues from our Divine Alphabet from we will call it.

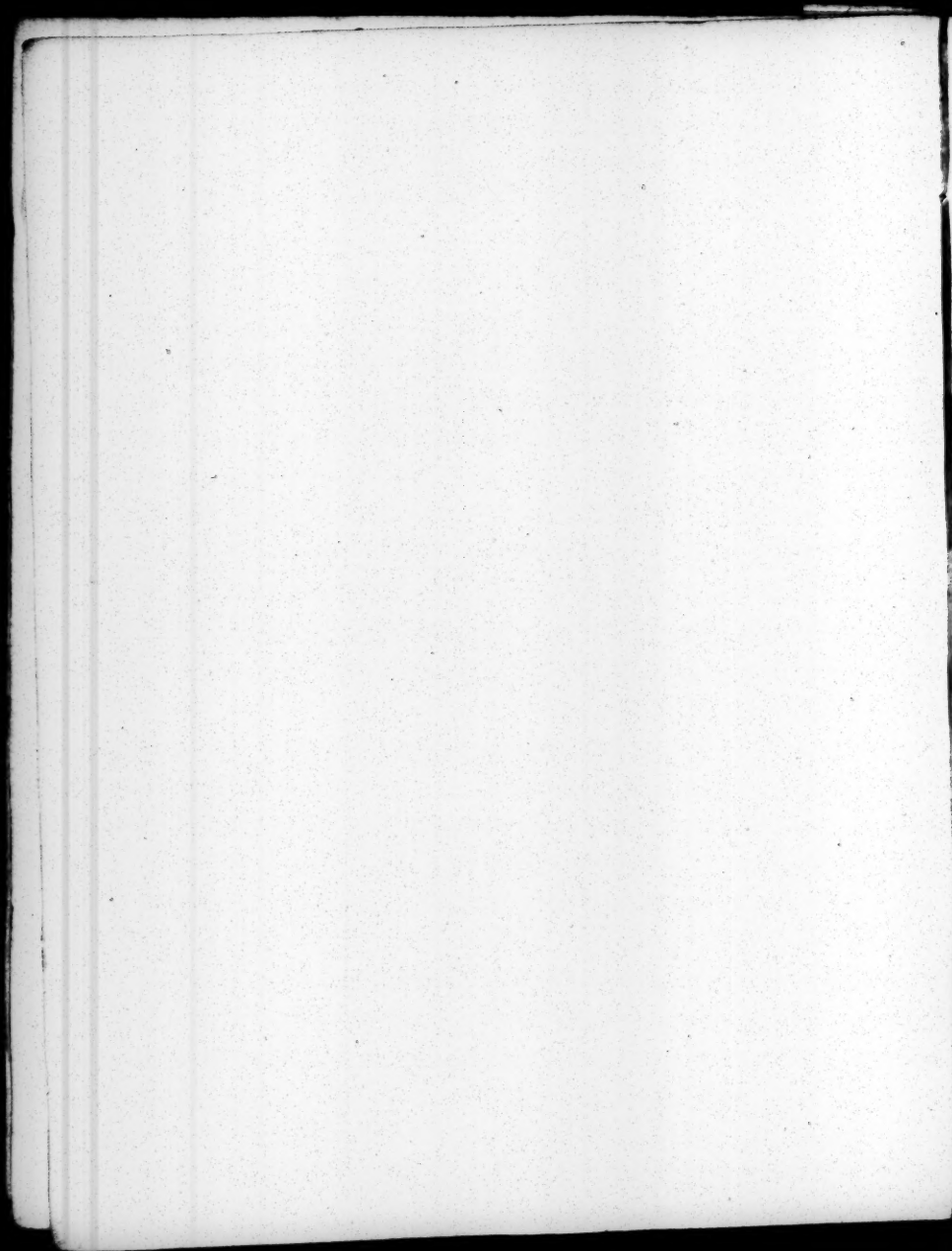
The Christian protestant Alphabet.

### Doctrine Institution, Consolation.

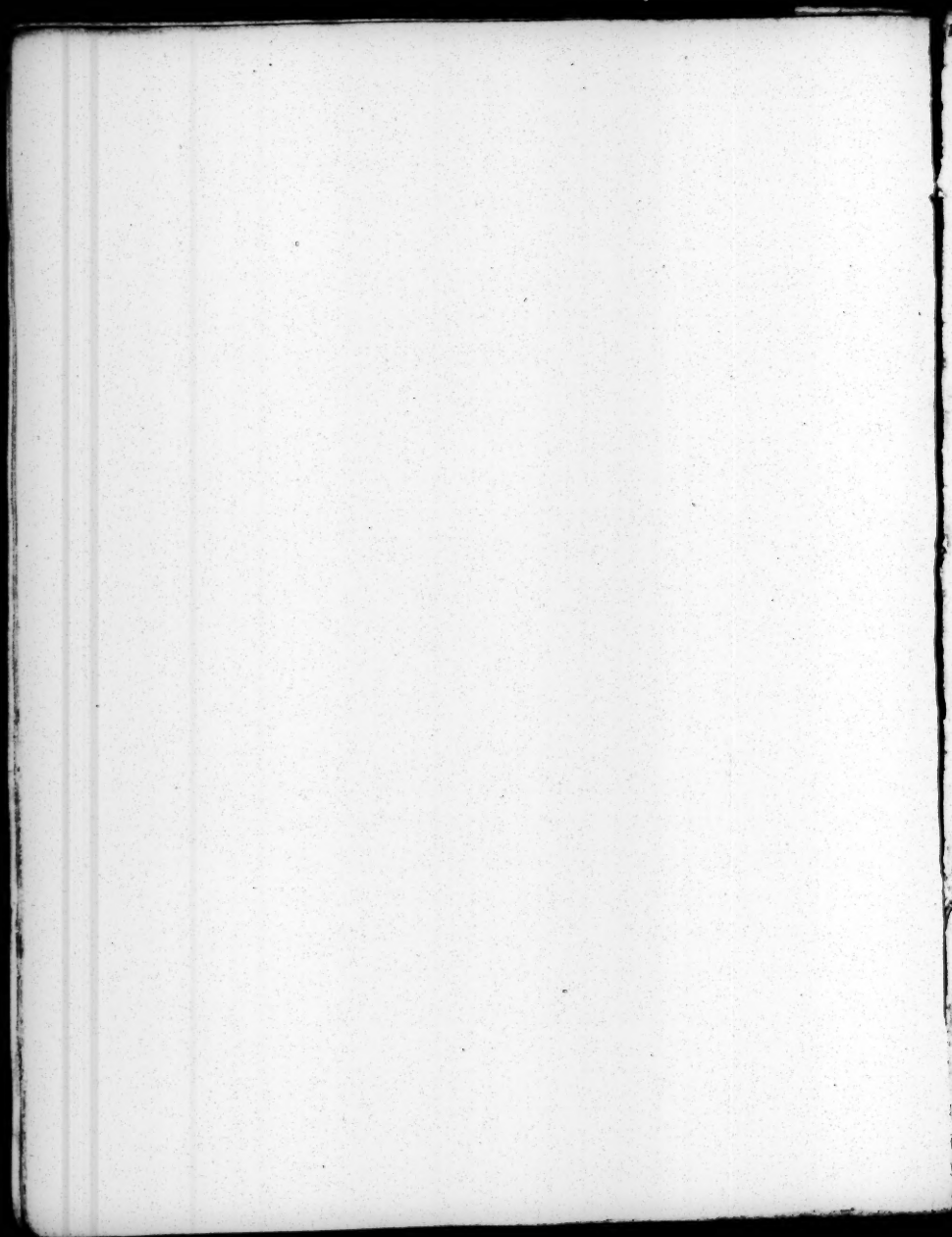
The first is y wordell, to it y second is Consent, and y third a Sixthony. then we place Doctrine between c and a: Institution between c and b: Consolation from c right up by e i n unto h'g.

Now we haue before us y booke of Gods word of Creation & y choise word of his providence, which is y word of God in our hearts. It is a Tenent in Divinity. That wh every one shall answer for their owne sinnes, so shall we if we be gilty of others mens sinnes: but if at any time we be taught full Doctrine and Institution & will be misfed by them then are we gilty of that teachers sinne. therefore to Remedy this, we must learne well y 2 Divine vertues of Doctrine in our Christian vinture, & Institution in y depths of aye life if ever we how to obtaine y two heavenly Quarters of Consolation, and the Love of God!



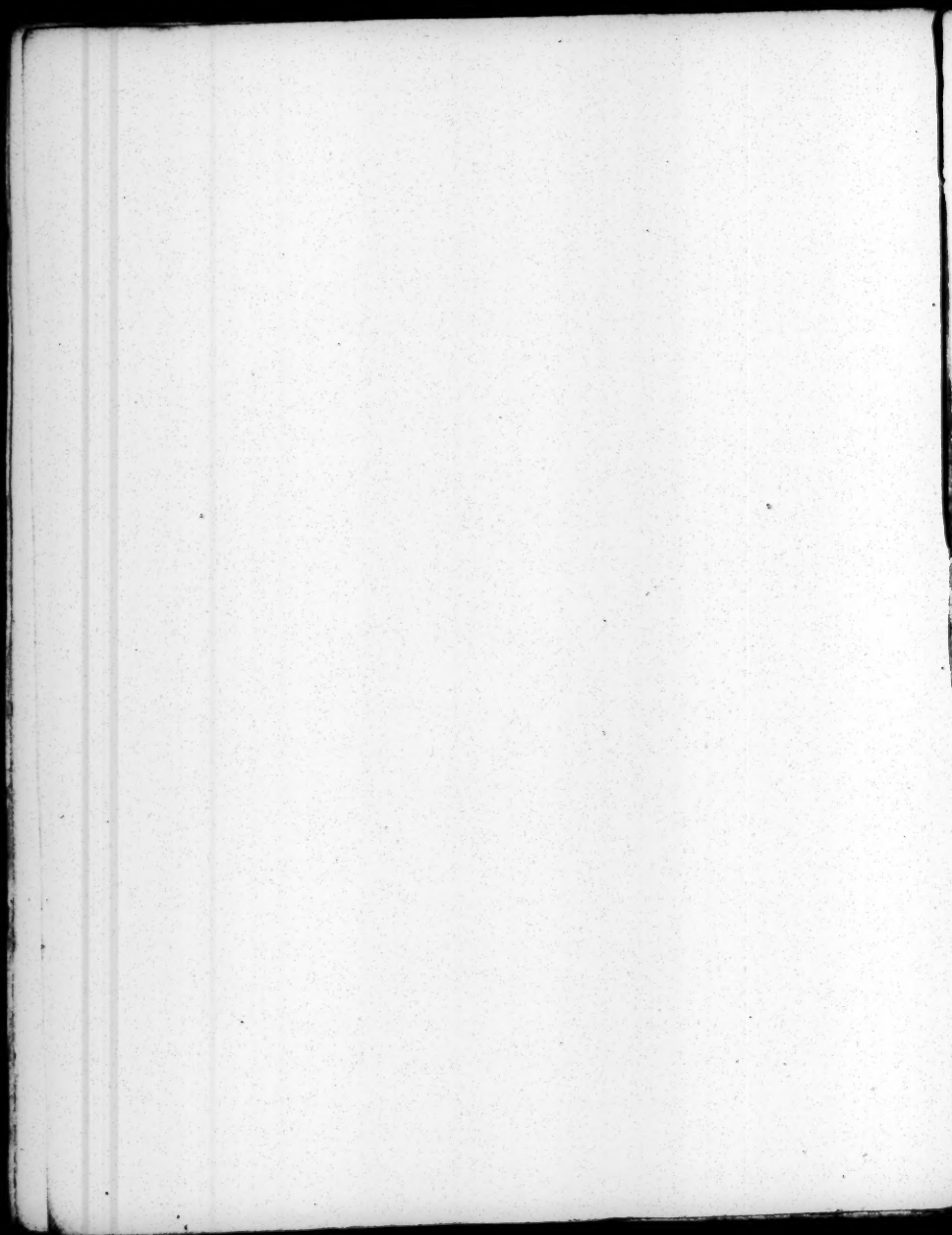












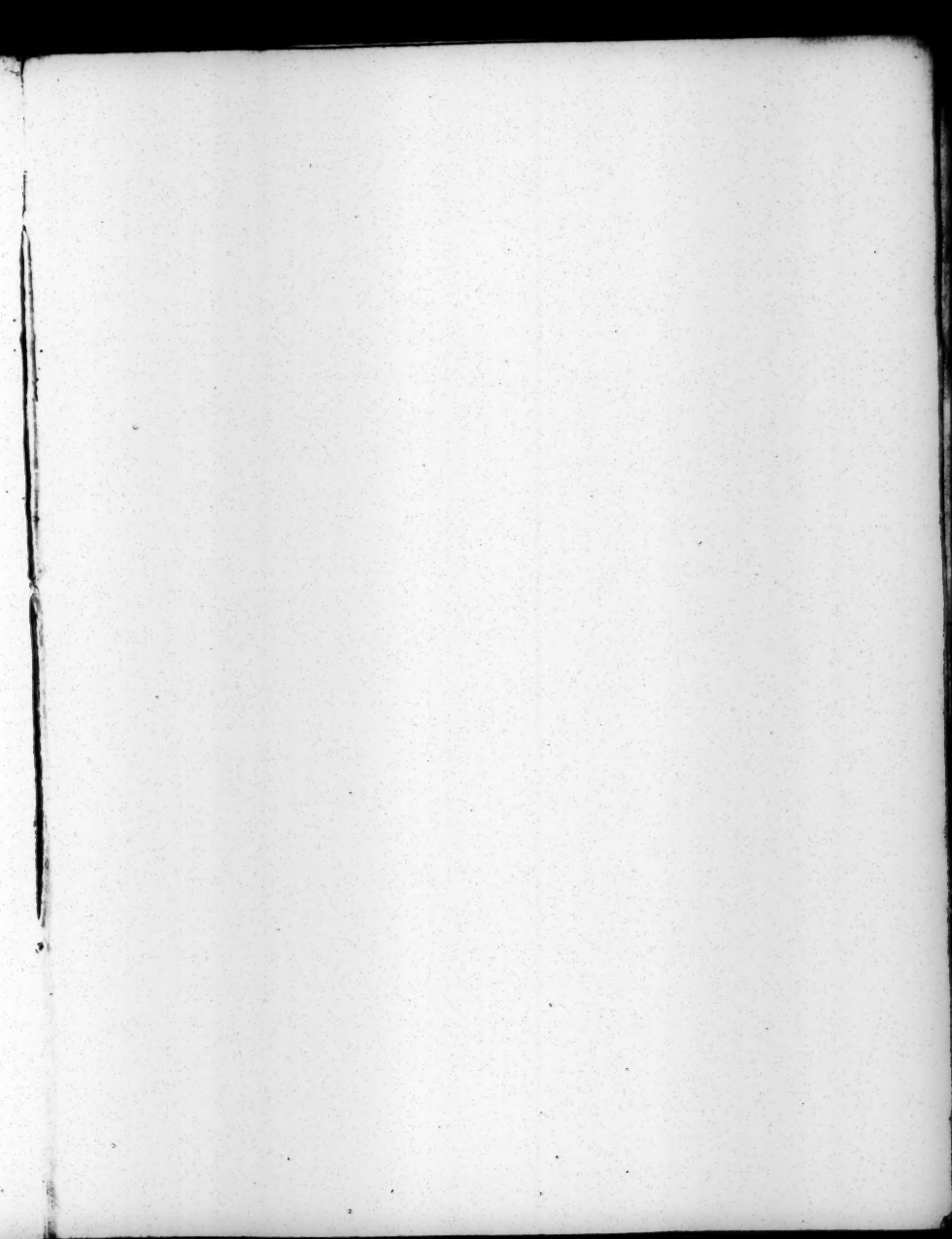






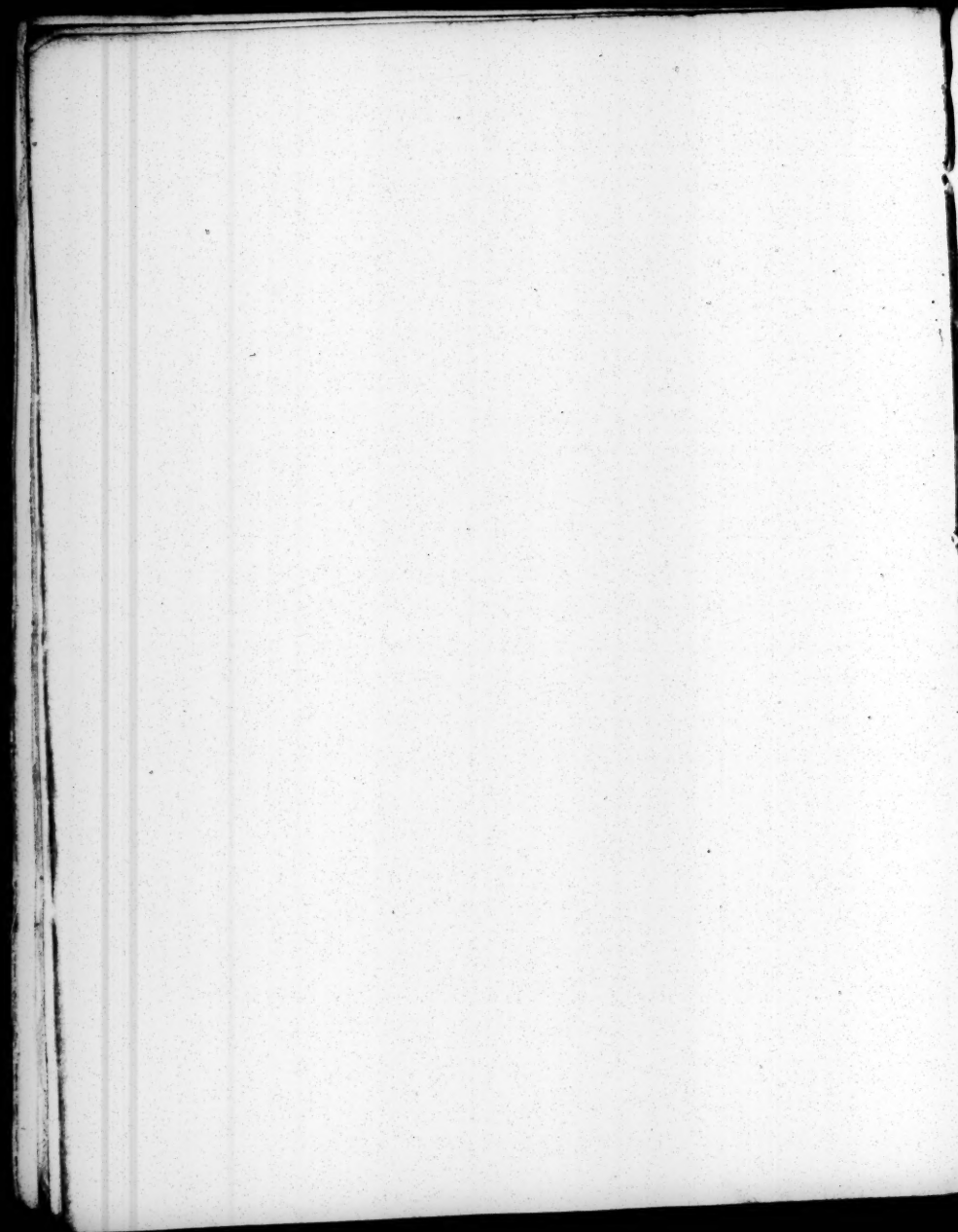
















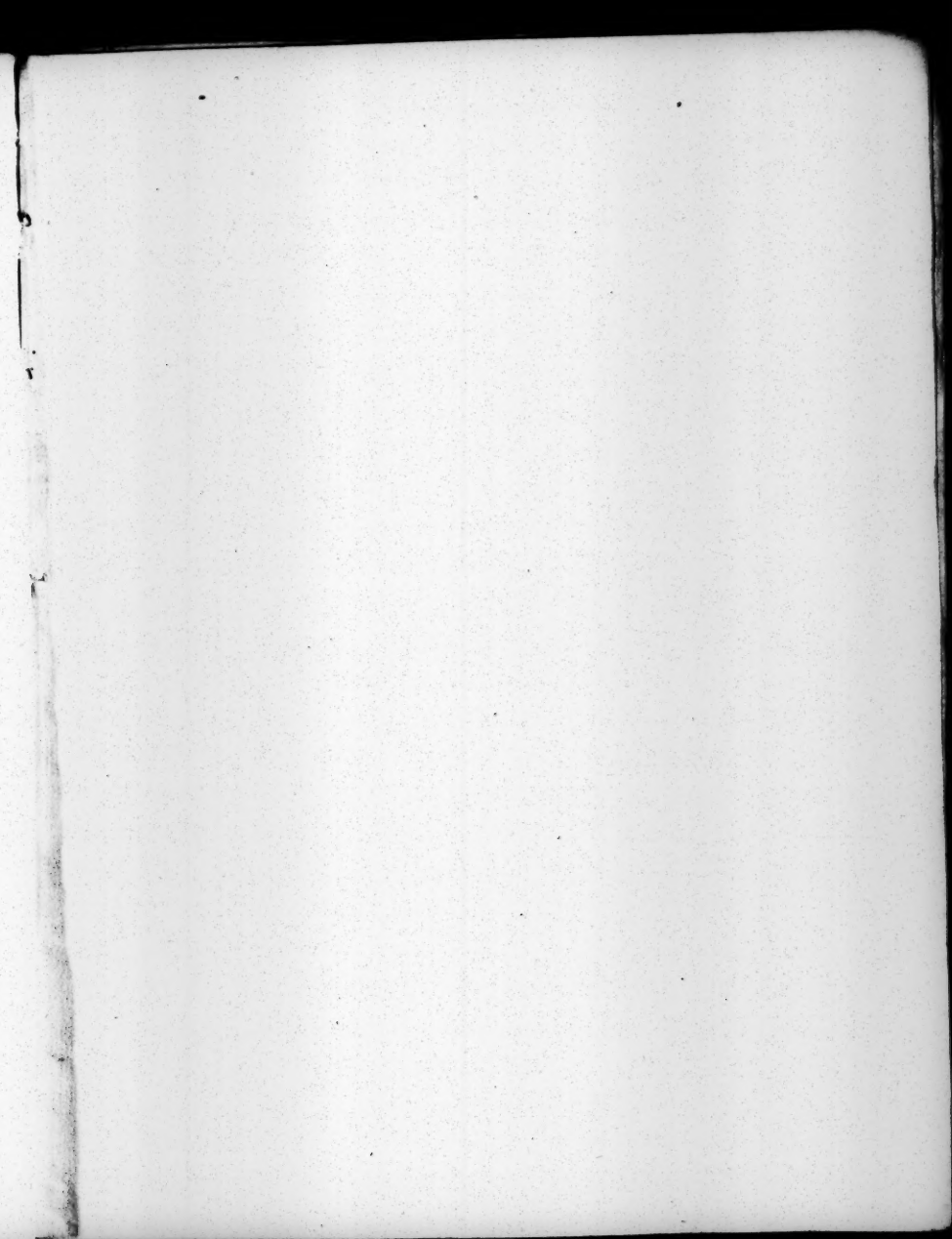


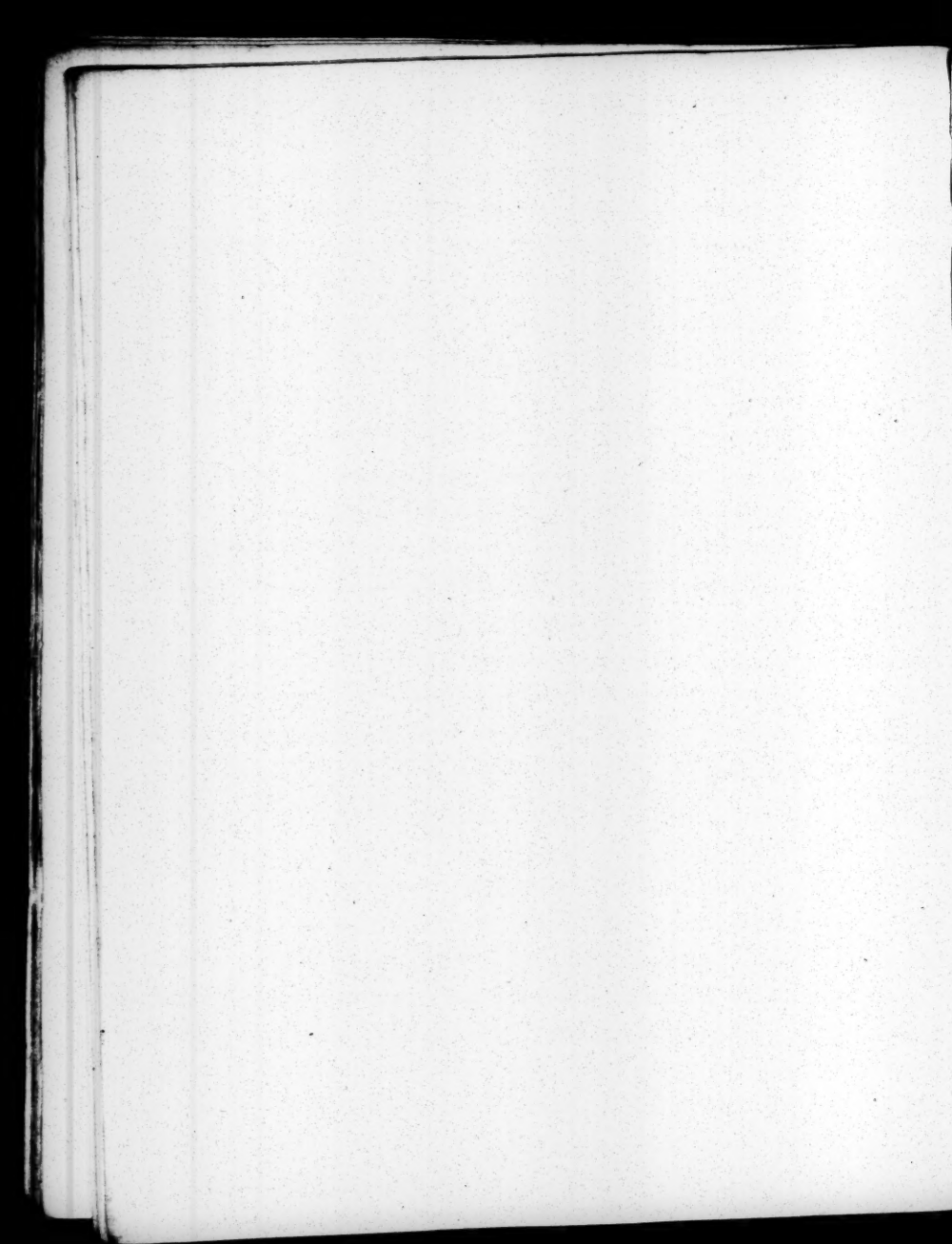














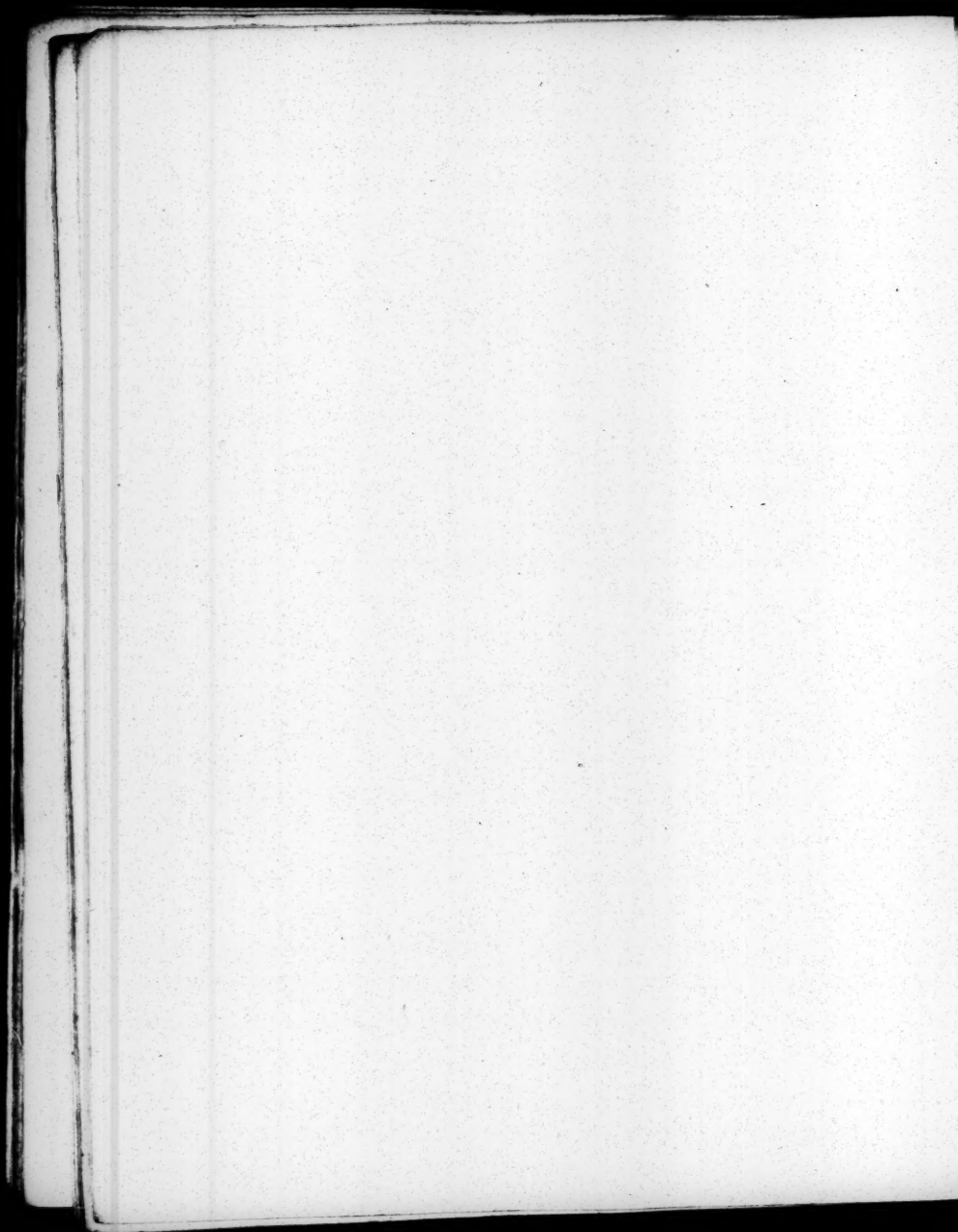






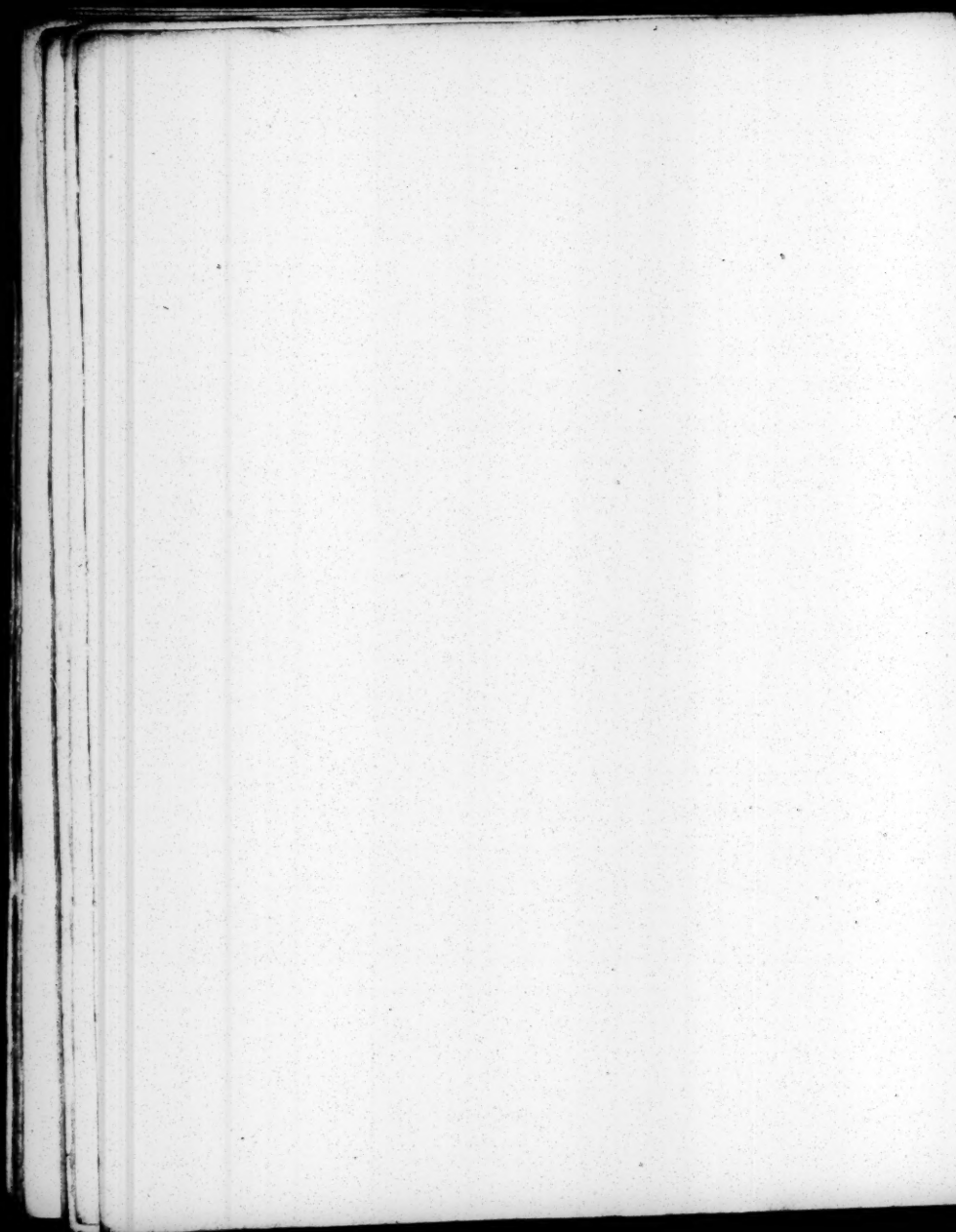




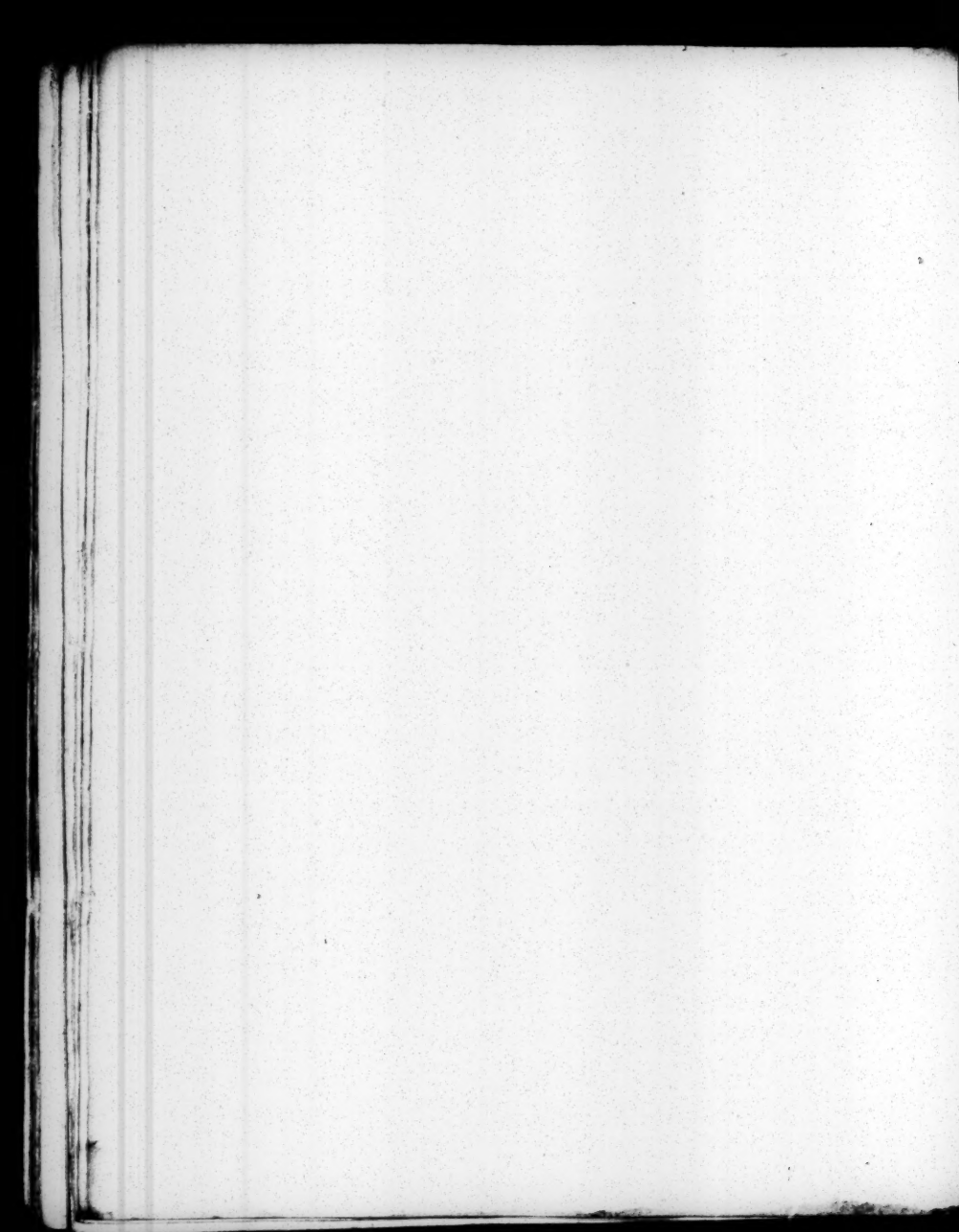












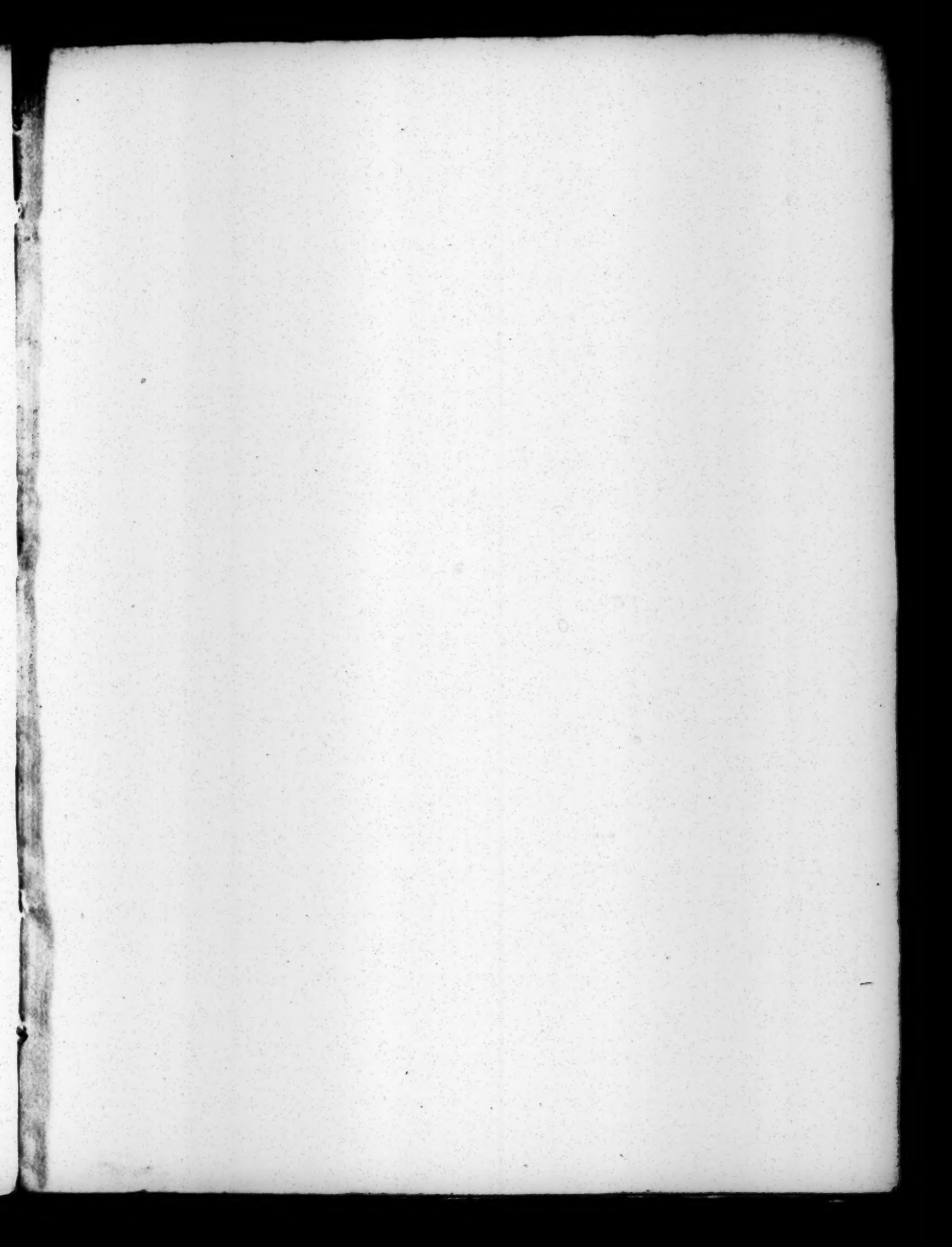




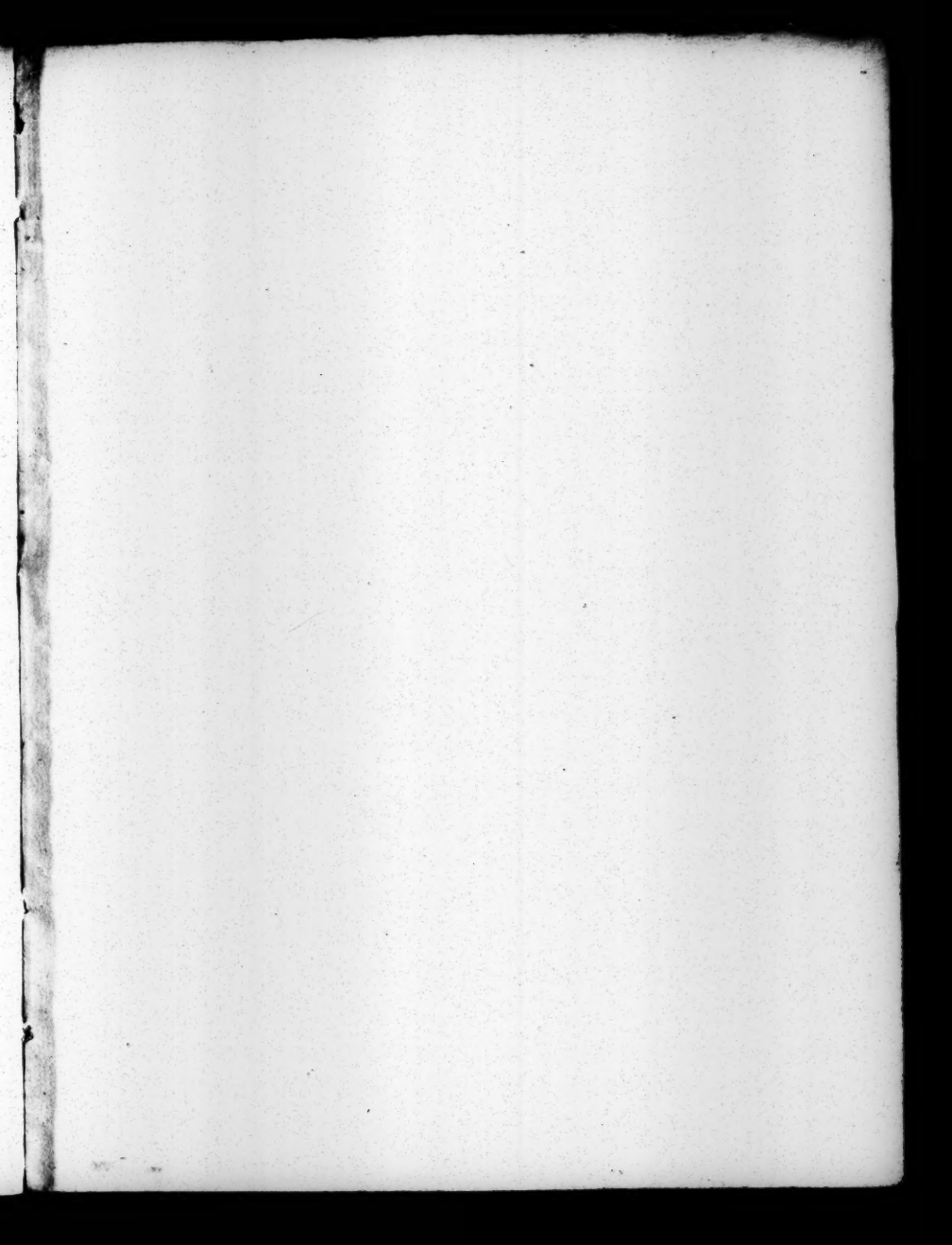


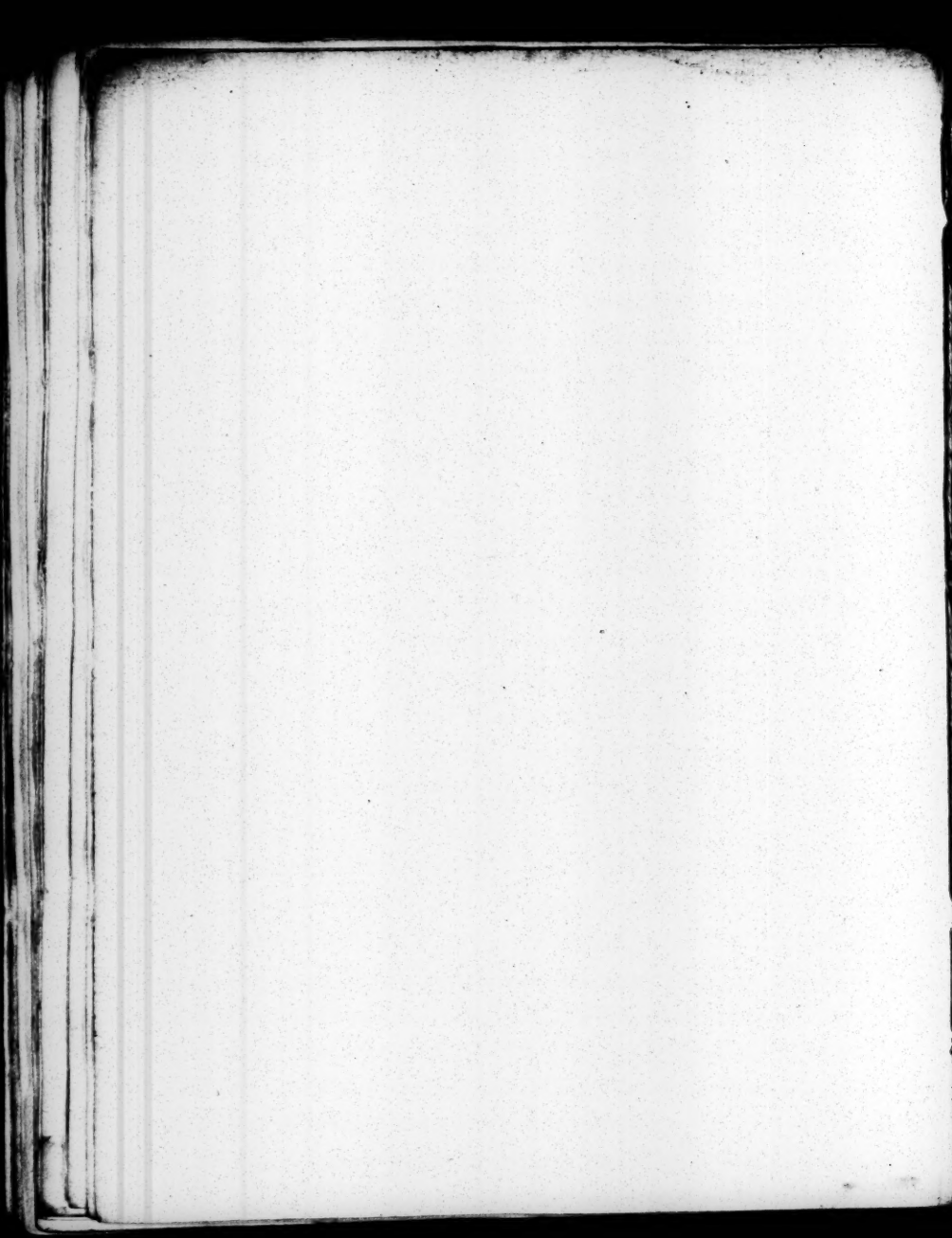




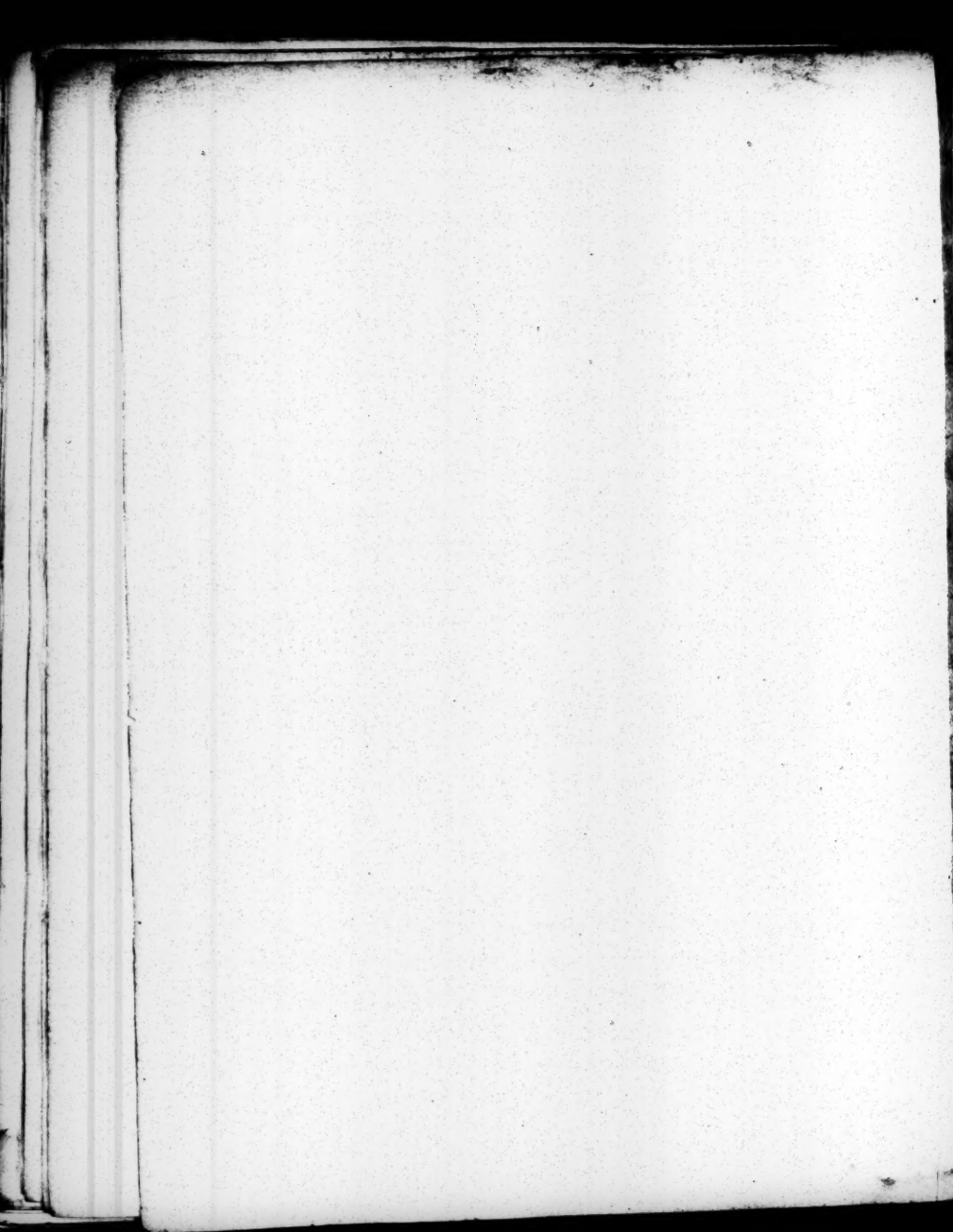














To Mr. *Alexander Blackhall* the Gram-  
marian, to Mr. *John Hunied's* the Chymist, a paire  
of my learned Friends; and to the head of  
*my owne Family, now and  
hereafter.*



Have chosen you three, and commit  
the tuition of this my little Library  
into your hands; you deare Kindred  
of my owne posterity both Lineall  
and Collaterall as Guardians: and  
these to over-see that nothing be a-  
miss in the Orthography, and Chy-  
mistry. Let all such as come to make  
use of it; first examine whether they  
doe not follow so much humane Invention, that thereby they  
neglect Gods workes; then whether their owne Inventions  
favour not more the practice of Beasts, then of Reason and  
understanding; and whether or no the operative vertue of all  
Creatures doe not exceed their owne: And when they are  
Resolved in these Theames, let them enter and proceed; for  
now wee are come to the *Epilogue* and the doore where wee  
began and entred; wee have been round in the Circle of it,  
and measured the Diameter, and it is 7; so with *Archimi-  
des* the Circumference is 22 neereast: But it is inexplica-  
ble; therefore I take all the Errours ro my selfe (except  
the



*The Epilogue.*

the Printers) without all which it will be perfect, as the Circle is; And because it is built in that most spacious form, doubt not but in time it will bee greatly increased; take it well in worth therefore now, and let all them, that in the meane time would bee further satisfied, repaire to the more accurate and Learned workes of this nature, that are made by the most (and best) learned Mathematicians, Physicians, Philosophers, Lawyers, and Divines. So wee conclude with thanks unto Almighty

G O D ;

*Cui laus & gloria in sempiterna secula,*

A M E N.



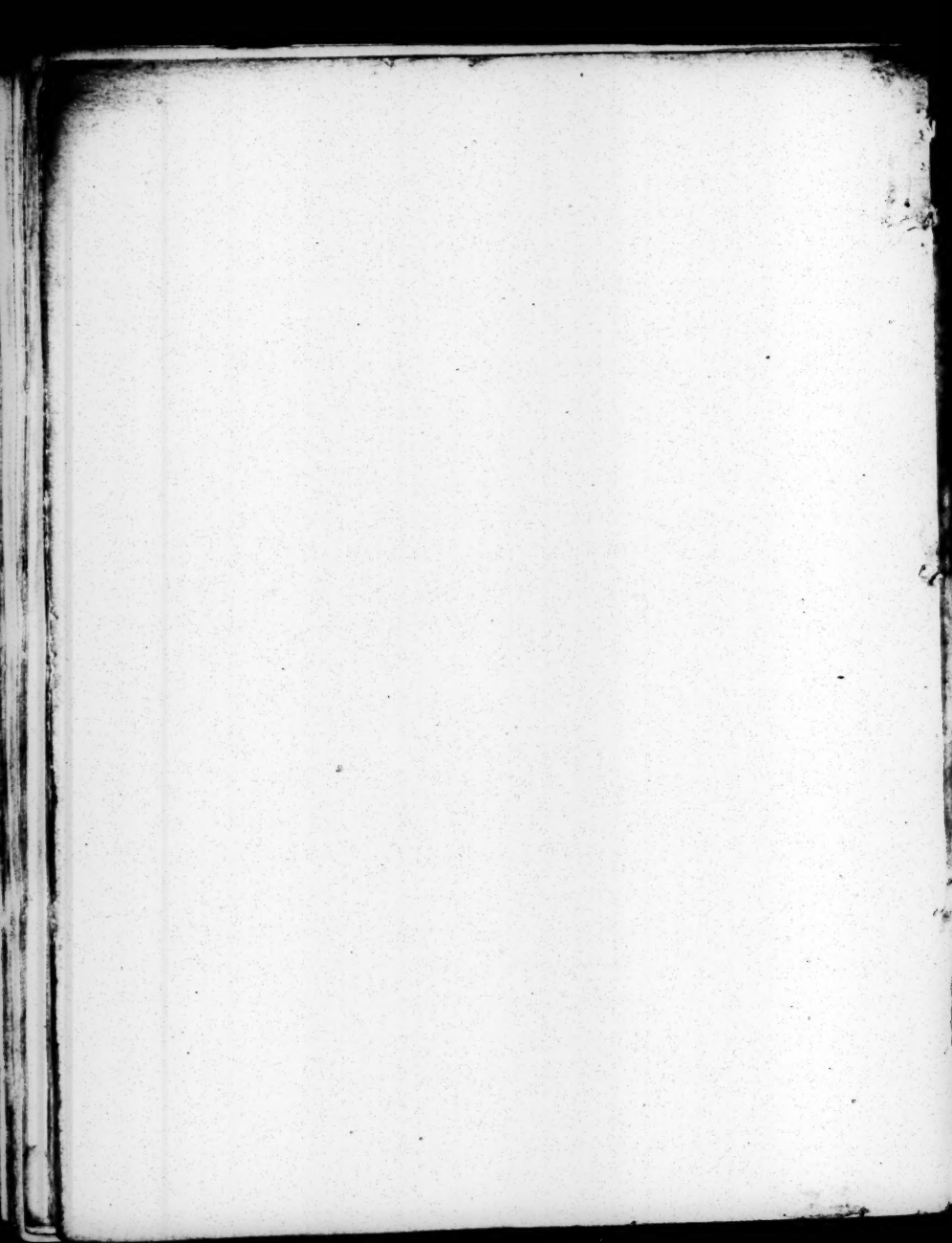


LOOSE LE  
IN VOLUME  
POSITION U

LEAVES FOUND

, CORRECT

UNCERTAIN.



# THE SEAMANS

ALPHABET and PRIMER,

WITH

*Syntagma Naucleri.*

ALSO,

To find the Difference of Longitude by  
Cœlestiall observation onely, with other Ma-  
thematicall knowledge for the better perfecting of  
young Sea-men in the Art of Navigation,

*Viz.*

In all the parts of Arithmetique and Geometry,  
the Doctrine of the Spheriques, and of right-  
lined Triangles, more amply then is yet  
published in English.

Precepts Astronomicall, Statique, and of Me-  
teorologie for Navigation needfull; with the  
uses of the Spheare, Globes, and all  
other Instruments necessary

The making of Evidences, and Wri-  
tings; Bills of Sale, Charter-parties, Sur-  
veying, Fortification, *De re  
Militari.*

By J. S. Notary publique.

Printed. MDCXLIV.



To our *English Mariners and Sea-men,*  
especially to my loving Schollers.



Eloved, it is not enough onely to Write and Reade after the vulgar manner, though it be commendable to doe that well, but there must be a further proceeding; as in these Bookes of, *The Sea-mans Alphabet,* *The Sea-mans Primer,* and *Syntagma Naucleri,* is manifest. Every one is Worldly wise by nature, fewer are Morally wise either by nature or Art rightly, fewest of all Sacred, Holy, and Divine. All Vertue is right Reason, and right Reason is a part of the Divine Spirit infused into the Humane body of Man; by which we understand in part what our Soule is. Againe right Reason is Governed by the most divine Spirit, but all Vertues are rightfull Reasons, therefore all Vertues are governed by the most Divine Spirit, that is by the Holy Ghost, which is God. So our Soules being Divine Spirits with the rest of the whole Man, are made Vertuous, when the sensuall and brutall part of Man, is subjected to right Reason, but if the brutuall and sensuall part of Man do over rule the Rationall part, which is the Soule, then the Devil bringeth in Vice, Sinne, and all Wickednesse, being voyde of Reason.

There is nothing more shamefull in an old Man, then this. *viz.* That to prove he hath lived long in the World, can produce no other witnessse, but the number of his yeares; now there is crept into the Commonwealt of Sea-men, among yong and old; a most absurd kind of teaching and learning the Art of Navigation by Instrument only, (*Sine Artibus*) which unto me seemeth as ridiculous as to huddlewinke a Man, and then give him a Staffe; but here you are better informed; take paines in it therefore, and Almighty God give us his blessings withall, Amen.

Vale.

From my house in Lime-house  
January 1. 1545.

*F. S.*



To y<sup>e</sup> Diligent Reader.

In y<sup>e</sup> 1<sup>st</sup> Page it sheweth how to put y<sup>e</sup> Question  
3 waies: not that these are no more questions.

But what sort of Question or Demand  
it may be resolved one of these 4 waies.

- 1 By a full and perfect Answer, or large  
discourse to give satisfaction.
- 2 By a short and brief Answer to y<sup>e</sup> Demand.
- 3 By induction of many like words and things,  
to give a good Answer.
- 4 By bringing good Examples, or  
suffit<sup>er</sup> Citations.

And all these Answers shall  
made if they hold true. & so

- 1 To natural Reason.
- 2 To Common Experience.
- 3 To the Authorities of great  
Scientists.
- 4 To Philosophy.
- 5 To God.

or thus to y<sup>e</sup> 1<sup>st</sup> & 2<sup>d</sup> & 3<sup>d</sup> & 4<sup>th</sup> & 5<sup>th</sup>

Chaps. 1<sup>st</sup> & 2<sup>d</sup> & 3<sup>d</sup> & 4<sup>th</sup> & 5<sup>th</sup>

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